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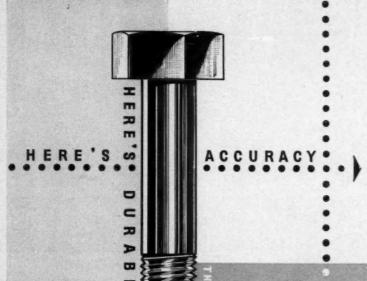
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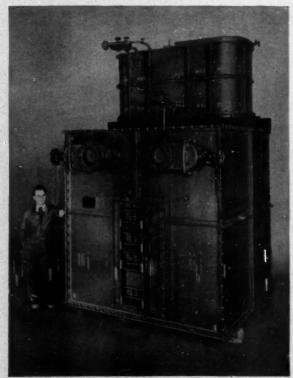
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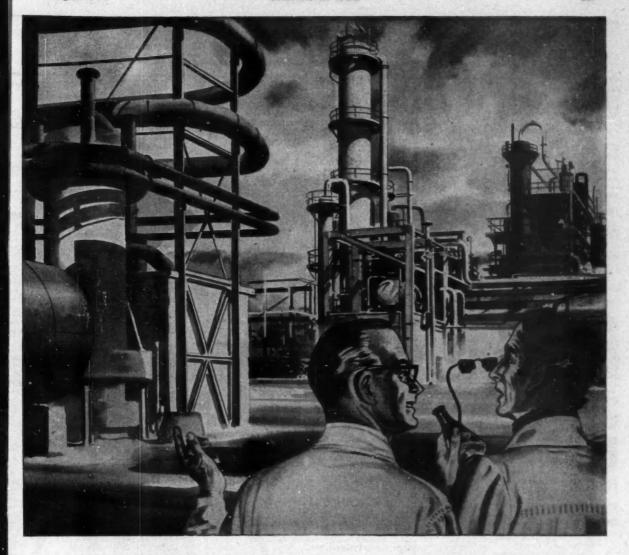
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INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, the second to the current issue

Page	Page	Page		Page	Page		Pag
29 A.P.V. Co., Ltd., The 44 Acalor (1948) Ltd.	244		British Thomson-Houston Co. Ltd.	-	200 E	Dowlow Lime & Stone Co., Ltd.,	
44 Acalor (1948) Ltd.	-	170	British Titan Products Co., Ltd.	-	70.00	The	-
09 Accrington Brick & Tile Co., Ltd.,	67/16/20	397	Broadbent, Thomas, & Sons, Ltd.	-		Oring & Fage Ltd.	100
The		231	British Titan Products Co., Ltd. Broadbent, Thomas, & Sons, Ltd. Brotherhood, Peter, Ltd. Brotherton & Co., Ltd. Browns Foundry Co., Ltd. Browns Foundry Co., Ltd. Brush Design Group, The Bryan Donkin Co., Ltd., The Buell (1952) Ltd. Burnett & Rolfe Ltd. Buss Ltd.	HIIIIIIIIIII		Drummond Patents Ltd.	-
76 Adequate Weighers Ltd. Aero Research Ltd.	пинини	244	Brotherton & Co., Ltd.	-	195 E	Oryden, T., Ltd.	23
22 Aimer Denducts I td		234	Brough, E. A., & Co., Ltd.	-	L	Dunlop Rubber Co., Ltd.	384.7
50 Albany Engineering Co. Ltd. The		218	Browns Foundry Co., Ltd.			Outt, P. K., & Co., Ltd.	
Alexander Herbert & Co. Ltd., The	ALC: N	175	Bryan Donkin Co. Itd. The				
Amalgamated Oxides (1939) Ltd. Alexander, Herbert, & Co., Ltd. Allen, Edgar, & Co., Ltd. Allen, Edgar, & Co., Ltd. Amalgamated Oxides (1939) Ltd.		180	Buell (1952) I to		232 E	E.D.C., Ltd.	
64 Alumina Co. Ltd. The	THE REAL PROPERTY.	180	Burnett & Rolfe I td	100	330 E	Edison Swan Electric Co., Ltd., The	24
28 Amalgamated Oxides (1939) Ltd.		-1-	Buss Ltd.	100	E	Electric Resistance Furnace Co. Ltd.	-
06 Armour & Co., Ltd.		100	Butterworths Scientific Publications	4	268 F	Electronic Switchgear (London) Ltd	-
3/Cd. Ashmore, Benson, Pease & Co.	-	201	Butterfield, W. P., Ltd.	- Marco	244 E	Electrothermal Engineering Ltd. Elliott, H. J., Ltd.	-
7/Cd. Ashmore, Benson, Pease & Co. 89 Ashworth, Arthur, Ltd.	-	1000		7.31	B/Mk.	Elliott, H. J., Ltd.	-
Associated Lead Mirs, Ltd.	-	13.5			The second	emcer Products	24
G/Cd. Audley Engineering Co., Ltd. 46 Autometric Pumps Ltd.	-	100		81 5117	E	Enamelled Metal Products Ltd.	-
46 Autometric Pumps Ltd.	-	160	Colder Vala Classocales Ltd	0 30 51	166 E	English Glass Co., Ltd., The	-
		100	Calder Vale Glassworks Ltd.	-	G/Ca.	Erinoid Ltd.	7 .
	1	Set 1	Callow Rock Lime Co. Ltd. The	-	207	Evered & Co., Ltd.	-
		354	Calder Vale Glassworks Ltd. Callow, F. E. (Engineers) Ltd. Callow Rock Lime Co. Ltd., The Candy Filter Co., Ltd., The		STATE OF		
		334	Cannon (G. A.) Ltd.		- F	airey Aviation	-
		238	Candy Filter Co. Ltd., The Candy Filter Co., Ltd., The Cannon (G. A.) Ltd. Carbon Dioxide Co., The Carmichael, John R., Ltd. Catalin Ltd.		280 I	Farnell Carbons Ltd.	-
		280	Carmichael, John R., Ltd.		202	Fawcett Finney Ltd.	-
		243	Catalin Ltd.	T	202 I	Ferris, J. & E., Ltd. Fleischmann (London) Ltd. Film Cooling Towers (1925) Ltd.	
12 B. A. Holland Engineering Co., Ltd.,		1000	Chapman & Hall Ltd.	-	220	Fileschmann (London) Ltd.	
The Design Lad	242	1	Chemical Construction	387	253 1	Forbose Verall Edd	1
82 Baker Perkins Ltd. 24 Baker Platinum Division, Engelhard			(Great Britain) Ltd.	=	233	Foxboro-Yoxall Ltd. Fraser, W. J., & Co., Ltd. Fuller's Earth Union Ltd., The	
24 Baker Platinum Division, Engelhard Industries Ltd.		191	Chemical Workers' Union, The	-	298	Fuller's Farth Union I td. The	10
		0.00252	Chemicals & Feeds Ltd.	-	270	die s Latti Olion Ltd., 1116	
10 Barday Kellett & Co. Ltd.		318	Chemitrade Ltd.	236	100		
250 Bennett Sons & Shears Ltd.	Ξ	284 203	Chesterfield Tube Co., Ltd., The	400	188 -0	Gallenkamp, A., & Co., Ltd.	
G/Cd. Berk. F. W. & Co., Ltd.	-	264		cov. iii		Gas Council, The Fro	nt co
233 Balfour, Henry, & Co. 210 Barclay Kellett & Co., Ltd. 250 Bennett, Sons & Shears Ltd. G/Cd. Berk, F. W. & Co., Ltd. 242 Beryllium & Copper Alloys (Safety		204	Cinema Television Ltd.	-	200	Geigy Pharmaceutical Co., Ltd. General Electric Co., Ltd.	
Tools) Ltd.	Ξ	444	Clark, T. & C., & Co., Ltd. Classified Advertisements 266, 26	7 260		Glebe Mines Limited	23
Bivac Air Co. Ltd.	-	258				Goodyear (Eynort Div.)	40
270 Black, B., & Son, Ltd.	-	199	Clayton Son & Co. Ltd., The	-	290	Graviner Mfg. Co. Ltd.	10.5
Tools) Ltd. Bivac Air Co. Ltd. 2 Blackman Keith Ltd.	-	288	Clayton, Son & Co., Ltd., The Clayton, Son & Co., Ltd. Clydesdale Chemical Co. Ltd. Clyde Tube Forgings Ltd. Cole, R. H., & Co., Ltd. Cole & Wilson Ltd.		265	Graviner Mfg. Co., Ltd. Grazebrook, M. & W., Ltd. Greeff, R. W., & Co., Ltd. Grindley & Co., Ltd.	
	232	285	Clyde Tube Forgings Ltd.		164	Greeff, R. W., & Co., Ltd.	
148 Borax Consolidated Ltd.	-	213	Cole, R. H., & Co., Ltd.		192	Grindley & Co., Ltd.	
Borax & Chemicais Ltd.	-	208	Cole & Wilson Ltd.	-	1		
289 Boulton, William, Ltd.	-	204	Collins improved Firebars Ltd.	-	232	Hackbridge & Hewittic Electric Co.,	
228 Bowmans Chemicals Ltd. 270 Braby, Fredk., & Co., Ltd.	1	State of	Con ventuation Ltd.	-		Ltd.	
183 Bramigk & Co., Ltd.	-	100	Colvin-Smith Ltd.	-	202	Haller & Phillips Ltd.	
British Achaeon Flectrodes I td		348		-	214	Hanovia Lamps	-
224 British Arca Regulators Ltd.			Constable & Co.			Hanson Books	20
224 British Arca Regulators Ltd. 217 British Carbo Norit Union Ltd.	30	PIA	Controlled Convection Drying Co.	940	206	Harris (Lostock Gralam) Ltd.	24
British Ceca Co., Ltd., The		1 .	Costain-John Brown Ltd.	239	222	Haworth, F. (A.K.C.) Ltd.	70
British Ceca Co., Ltd., The 216 British Chrome & Chemicals Ltd.		4	Crofts (Engineers) Ltd. Cromil & Piercy Ltd. Cruickshank, R., Ltd. Curran, Edward, Engineering Ltd.		158	Hearson, Charles, & Co., Ltd.	
(London)	_	171	Cruickehank P I td	-	238	Herbert, Alfred, Ltd.	Ha .
230 British Chrome & Chemicals Ltd.	SALE OF	334	Curren Edward Engineering Ltd	-	193	Hickson & Welch Ltd.	
(Lancs)	229	304	Cyanamid Products Ltd.		234	Holroyd, John, & Co., Ltd. Honeywill & Stein Ltd. Hopkin & Williams Ltd.	
British Drug Houses Ltd., The	236	222	Cyclops Engineering Co. Ltd., The		248	Honkin & Williams I td	40
British Geon Limited	-	288	Cygnet Joinery Ltd.	4-12	187	Humphreys & Glasgow Ltd.	
8 British Industrial Solvents	-	200	The state of the s			Huntington, Heberlein & Co. Ltd.	11
236 & 237 British Laboratory Ware Association Ltd.	1000	1000			210	rammington, rieverioni & Co. Ltd.	
Association Ltd.	-	1					
275 British LaBour Pump Co., Ltd.	-	1			210	I C I Billiagham Occasio	-
240 British Lead Mills Ltd.	-	-	B 1 (8)		310	I.C.I. Billingham Organic	2
660 British Railway Traffic & Electric	TOP STATE	286	Danks of Netherton Ltd.	_		I.C.I. General Chemicals Solvents	
Co., Ltd.	-	216	Davey, Paxman & Co., Ltd. Dawson, McDonald & Dawson Ltd.	-	1 3	I.C.I. Plastics—Darvic I.C.I. Plastics—Fluon. I.C.I. Ltd., (Plastics Div.) Corvic	
Spine British Resin Products Ltd.	-	170	Dawson, McDonald & Dawson Ltd.			I C I I td (Plastics Div.) Comic	2
172 British Rototherm Co., Ltd., The	Ξ	170	Derby Luminescents Ltd. Dorr-Oliver Co., Ltd.	Ξ		Imperial Chemical Industries Ltd.	4
227 British Steam Specialties Ltd. 168 British Tar Products Ltd.	-	161 280	Douglas, William, & Sons Ltd.	-	1	continued on po	
		1 400	Loughes, William, & Sons Ltd.	minute.			

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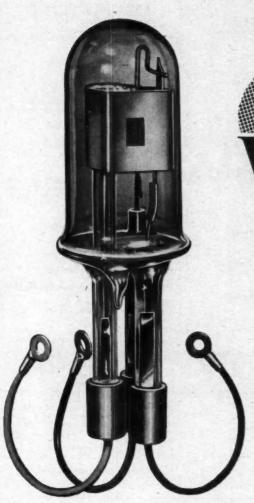
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INDEX TO ADVERTISERS

The first figures refer to advertisement in Chemical Age Year Book, the second to the current issue

Page		Page	Page		Page	Page		Pag
157	Imperial Smelting Corporation (Sales)	15 18.50	180		-	344	Southern Instruments Computer	THE R
	Ltd.	-	254	Mitchell Cotts & Co., Ltd.	200		Division	-
	Industrial & Marine Protective	100		Mond Nickel Co., Ltd., The	265	338	Spencer Chapman & Messel Ltd.	7
	Applications Limited International Combustion Group	100	317	Monsanto Chemicals Ltd.	_	396	Stabilag Co., Ltd., The Stanton Instruments Ltd.	***
	International Combustion Group		200	Morgan Crucible Co., Ltd., The Moritz Chemical Engineering Co.,		370	Staveley Iron & Chemical Co. 144	1
		MARKET ST	200	Ltd.	234	212	Staveley Iron & Chemical Co. Ltd. Steel, J. M., & Co., Ltd. Stockdale Engineering Co., Ltd. Stonehouse Paper & Bag Mills	
7144		T/675/25	1500		GI ST	1000	Stockdale Engineering Co., Ltd.	2.1
246	Jackson, Henry (Liverpool) Ltd.	-	3.85		The Land	100	Stonehouse Paper & Bag Mills	26
214	Jackson I G & Crockatt I td	шини	181	Neckar Water Softener Co. Ltd.	-	13.5	Streamline Filters Ltd.	
245	Jenkins, Robert, & Co., Ltd. Jenkinson, W. G., Ltd. Jobling, James A., & Co., Ltd. Johnson, S. H., & Co., Ltd. Johnsons of Hendon Ltd.	-	268	Nederlandse Emballage Ondeernem- ing Gebr. de Wilde N.V.	1	251	Sturge, John & E., Ltd.	
3	Johling, James A. & Co. Ltd.	-		ing Gebr. de Wilde N.V.	245	231	Sutcliffe Speakman & Co., Ltd.	-
3	Johnson, S. H., & Co., Ltd.	1000	221	Negretti & Zambra Ltd.	241	27-31		
166	Johnsons of Hendon Ltd.	200	150	New Metals & Chemicals Ltd. Newnes, George Co., Ltd.		279	Taylor Rustless Fittings Co., Ltd.	
267	Jones, Tate & Co., Ltd.	-	276	& 277 Newton Chambers & Co. Ltd.	Ξ	235	Tenaplas Sales Ltd.	
188		157	239	Nicolson, W. B. (Scientific Instru-	THE IA	218	Thermal Syndicate Ltd., The	23
228	K.D.G. Instruments Ltd.	19 50 10	100	Nicotson, W. B. (Scientific Instru- ments) Ltd. Nordac Ltd.	Ξ	196	Thomas & Bishop Ltd. Thomason, W., & Sons Ltd.	-
178	K. D.G. Instruments Ltd. K. W. Chemicals Ltd.	With the last	177	Nordac Ltd.	-	145	Thompson, Ichn (Dudley) I.44	113
	Kaylene (Chemicals) Ltd.		211 194	North Thames Gas Board	-	143	Thompson, John (Dudley) Ltd. Todd Bros. (St. Helens & Widnes)	
278	Kaylene (Chemicals) Ltd. Kernick & Son Ltd.	-	194			1000	Ltd.	
395	Kestner Evaporator & Engineering	10 97	179	Ltd., The Northey Rotary Compressors Ltd.	_	198	Towers, J. W., & Co., Ltd.	23
	Co., Ltd.	cov. ii	1/9	Northey Rotary Compressors Ltd. Nu-Swift Ltd.	100	197	Trent Valve Co., Ltd.	-
395	Kestner Evaporator & Engineering	1	11000		THE R.		Tungstone Products Ltd.	1500
	Co., Ltd. (Keebush) Kestner (Industrial Safety) Ltd	220	1983			2450		
	Key Engineering Co., Ltd., The	230	296	Palfrey William I td	100	259	Unifloc Ltd.	
283	Key Engineering Co., Ltd., The Kier, J. L., & Co., Ltd.	Ξ	730	Palfrey, William, Ltd. Paper Good Manufacturing Co., Ltd.		1	Unilever Ltd.	
271	Kleen-e-ze Brush Co., Ltd.	1000	750	Pascall Engineering Co. Ltd. The	e 240	1	United Coke & Chemicals Co. Ltd.	24
-	Co., Etc.	PERMIT	6	Pascall Engineering Co. Ltd., The Paterson Engineering Co. Ltd., The		247	United Filters & Engineering Ltd.	
200	Lookes Charles to the	S. Contraction	287	Peabody Ltd.	-	1	United Kingdom Atomic Energy	
206	Lankro Chemicals Ltd.	238	1000	Penrhyn Quarries Ltd.	Ξ	1000	Authority	
184	Laporte Chemicals Ltd. Lavino (London) Ltd.			Pergamon Press	-	1000		
252	Leda Chemicals Ltd.		320	& 368 Permutit Co., Ltd., The	-	1500	Vaughan Crane Co., Ltd.	1
264	Leek Chemicals Ltd.	-	U/C	Cd. Petrocarbon Developments Ltd. Petrochemicals Ltd.	243	321.0		
162	Leigh & Sons Metal Works Ltd.	230	340	Pool J. F. Ltd.		192		
1987	Lennig, Charles, & Co. (Great		340	Pool, J. F., Ltd. Pott, Cassels & Williamson		241	Walker Extract & Chemical Co. Ltd.	1
	Britain) Ltd.		358	Powell Duffryn Carbon Products Ltd.	-		Wallach Bros. Ltd.	24
210	Lengox Foundry Co., Ltd.	where I	G/C	Cd. Power-Gas Corporation, Ltd., The	_	263	Waller George & Son I td	1
274	Light, L., & Co., Ltd. Lind, Peter, & Co., Ltd. er London Aluminium Co. Ltd., The	. =	169	Price Stutfield & Co., Ltd.		161		
Com	tr London Aluminium Co. Ltd. The	135 (1)	1 000	Production Chemicals (Rochdele)		162	Ward Thos W 144	
	Longman Green & Co., Ltd.	- THUN	242	Production Chemicals (Rochdale)	FEE	185	Watson, Laidlaw & Co., Ltd.	
278	Lord, John L., & Son	_	261	Pve. W. G. & Co., Ltd.	Ξ	260	Wells, A. C. & Co., Ltd.	
V. Tal			201	Pye, W. G., & Co., Ltd. Pyrethrum Board of Kenya		182	Wengers Ltd.	
	Machine 10		188	Total Or Monja	100	217	Whessoe Ltd.	13
190	Machinery (Continental) Ltd.	-	10.00				Whiffen & Sons Ltd.	
257		-	1818	Q.V.F. Ltd.	-	196	Whitaker, B., & Sons Ltd.	1
342	Manesty Machines Marchon Products Ltd.	261 25	13.5	PROPERTY OF THE PARTY OF THE PA		163	Widnes Foundry & Engineering Co.,	1
226	Marco Conveyor & Fine Co. Ltd.		211	Reads Ltd	100	150	Ltd. Wilkinson James & Son Ltd.	1
168	Marco Conveyor & Eng. Co. Ltd. Matthews & Yates Ltd.	- 14 308	514	Reads Ltd. Richmond Welding Co., Ltd.	232	186	Wilkinson, James, & Son, Ltd. Wilkinson Rubber Linatex Ltd.	1
533	May & Baker Ltd.	HIIII HIIII	100	Robinson, F. & Co. Ltd.	434	273	Willcox, W. H., & Co., Ltd.	
173	Measuring & Scientific Equipment		GIC	Robinson, F., & Co., Ltd. Cd. Rose, Downs & Thompson Ltd.			Williams, & James (Eng.) Ltd.	1
150	Ltd.	-	230	Rotometer Manufacturing Co. Ltd.	_	172	Wilson, Edward, & Son Ltd.	15
0	Meigh Castings Ltd.	-	1	Carlo Carlo	THEFT	268	Wilde, Gebr. De Nederlandse	*
COV	er Metal Containers Ltd.	-	167	St. Helens Cable & Rubber Co. Ltd.	1	17.70	Emballage Ondernemming N.V.	
CIC	Metalfiltration Co., Ltd.	Carlo Tale	167		cov. ii	220	Wood, Harold, & Sons Ltd.	
174	Cd. Metalock (Britain) Ltd. Metcalf & Co.		182			184	Worcester Royal Porcelain Co., Ltd.,	
	Metropolitan-Vickers Electrical Co.,	12 5 7 1	285	Show Petrie Ltd.	-	1	The Worthington-Simpson Ltd.	
	Ltd.	100	255	Sheepbridge Alloy Castings Ltd.	100	281	Wynn (Valves) Ltd.	
178	Middleton & Co., Ltd.	Ξ	255 356 256 350	Shell Chemical Co., Ltd.	- Company			
	Mills Packard Construction Co., Ltd.	-	256	Siebe, Gorman & Co., Ltd.		225	Yorkshire Tar Distillers Ltd.	n.
215	Mine Safety Appliances Co. Ltd.	350	350	Sigmund Pumps Ltd.	-			171
-	Mirrlees Watson Co. Ltd., The	-	1	Simon, Richard, & Sons, Ltd.	_	426	Zeal, G. H., Ltd.	

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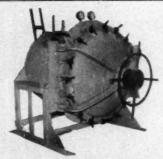
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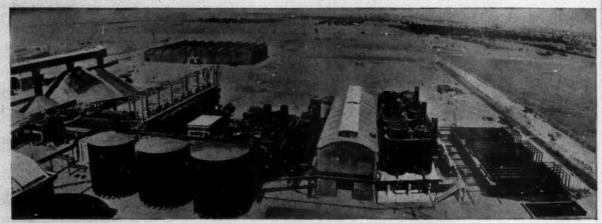
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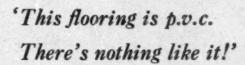
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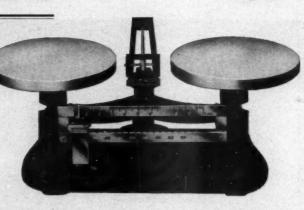
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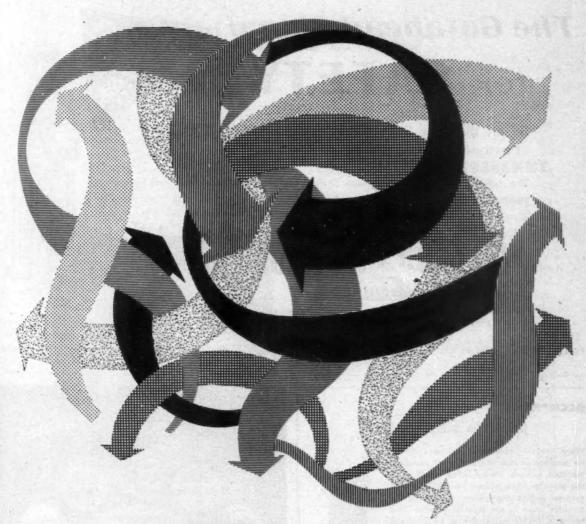
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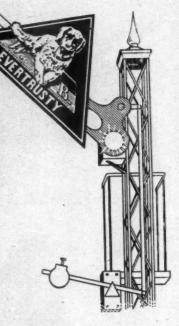


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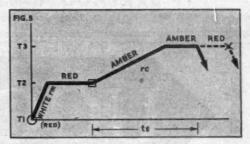


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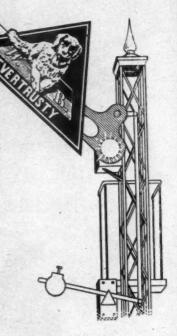
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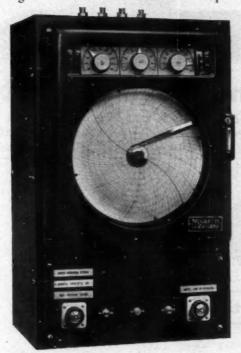


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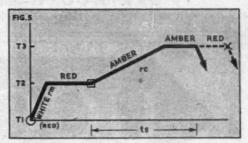
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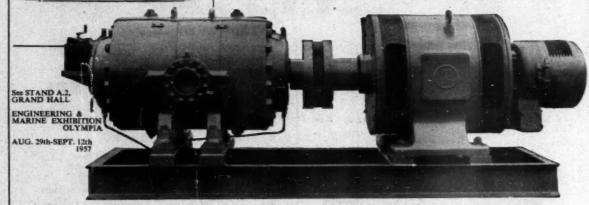
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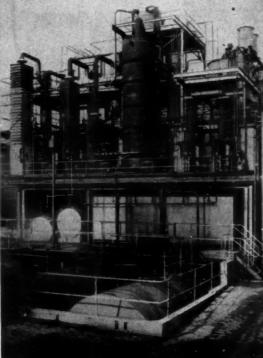
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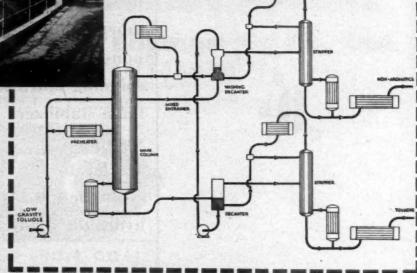
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IN THIS ISSUE

Nickel Supplies	246
DSIR Annual Report	247
Dunlop's New Factory	248
India's Plastics Industry	249
Food Investigation Report	250
Micro Chromatography For Metals	251
Distillates	252
Accident Prevention in Chemical	
Industry	253
Japan's Synthetic Fibre Production	255
New Process for Manganese	
Recovery	256
Overseas News	256
Bookshelf	258
People	261
Commercial News	262
Market Reports	262
Patents	263
Trade Note	264

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CHEMICAL

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US CHEMICALS FORECAST

A ccording to a semi-annual survey of expectations in US chemical industry, conducted by the American Chemical Society Division of Chemical Marketing and Economics (Chem. and Engng. News, 1957, 35, 12) the industry's leaders are relatively optimistic and are predicting moderate increases in production for the second half of the year. Considerable gains are expected in polythene production, with gains by butyl rubber and sulpha drugs.

Continued increase in US production in plastics is expected. Particular emphasis is laid on likely polythene production. Predictions for the first half of this year suggest an output of 285 million lb. with expectations of 339 million lb. for the last half of this year, giving an anticipated total of 624 million lb. for the year. Some experts feel that this suggested total will eventually prove to be on the low side, having regard to the high level of production in the second half of last year (300 million lb.).

Cautious optimism only is expressed for US synthetic rubbers generally. Butyl rubber is the one exception, production of which, marketing experts believe, will rise to 45 million lb. in the last half of 1957—a rise of 5 million lb. compared with the same period in 1956.

This predicted rise is not due to increasing consumption of this particular synthetic rubber. In fact consumption has been gradually decreasing since 1953 (77.8 million lb. in 1953 to 49.6 million lb. in 1956) due, it is stated, to the decline in shipments of inner tubes. Now it is reported that producers are accumulating stocks in readiness for the manufacture of a large number of experimental tyres for road testing. Advantages of butyl rubber for tyres are claimed to be smoother tread, less slip and greater road life. As there were previously difficulties in proper fabrication, it is assumed that these have now been overcome.

It may be surprising to learn of US optimism regarding sulphonamides, production of which has declined steadily since 1957. A \$21.5 million production value is being forecast for 1957. The reason for renewed interest in the sulphas is undoubtedly due to the recent investigations on the value of the new oral sulpha drugs to reduce blood sugar content and their application for certain types of diabetics.

Even more surprising would seem to be the optimistic view held in the US that viscose rayon and acetate rayon will recover from their 1956 slump. In that year there was a 192-million lb. drop in rayon production, 55 per cent of this being due to reduction in sales of tyre cord because of the growing use of nylon for this purpose. However, during the first quarter of this year, rayon shipments showed a 5.5 per cent increase over the 1956 average. Recent improvements in cord, the producers believe, will assist in maintaining this valuable outlet for rayon.

US use of rayon for carpets has increased phenomenally from just over I million lb. in 1951 to 88 million lb. in 1956. Rayon producers in this country have been concerned in recent months over rayon sales, particularly for textiles. The suitability of rayon for carpets has been taken up by the UK producers and they will no doubt be interested in US progress in this field.

Considerable optimism exists for production of other synthetic fibres in the US with suggestions that output is likely to reach 285 million lb. in the second half of this year.

Ideas on synthetic detergent trends are useful. In the US, detergent sales are levelling off now as is to be expected with a relatively stable consumer market for washing products. Soap sales which have been badly affected throughout by the growing use of detergents are expected to remain firm, by virtue ot bar soap, which is still unaffected by competition from detergents. A similar state of affairs exists in this country. However, in the US, new synthetic bars are now being placed on the market, but the effect of these on bar soap is unlikely to be felt for about a year. A strong price factor exists also, synthetic bars being quite expensive compared with soap bars.

It is certainly interesting to note that even in the US commercial laundries still consume significant quantities of soap and are stated to be less inclined than housewives to change to synthetics.

Excess capacity in nitrogen has been concerning fertiliser manufacturers in the US and Europe. However, as was re-

ported in CHEMICAL AGE, 15 June, p.1001, the ending of the long drought in the south-west of the US has resulted in heavy demands on fertilisers, and recently price increases in ammonia have been announced.

Normal superphosphate requirements are expected to remain steady at about 1.543 million short tons but triple superphosphate is likely to reach a new peak of 731,000 short tons. In fact, US fertiliser manufacturers consider that the 1958 crop year will be a record one for them. Indeed, the survey suggests that fertiliser production will be of the order of 1.26 thousand million short tons.

While only principal chemical end-use groups are reported, i.e. plastics, synthetic fibres, fertilisers, medicinals, etc., interdependence on the basic industrial chemicals affects these also. In all, the US chemical manufacturers are stated to be feeling quite confident. There appears to be, however, an undertone of conservatism which has not previously been apparent in US chemical industry surveys.

NICKEL SUPPLIES

MOST basic metals are now in more plentiful supply than they have been over the past few years. One metal has remained an exception—nickel. It is still in short supply and, until 1960, it would seem that it is likely to remain so. To some extent the shortage has been relieved by the US diverting large quantities of the metal from the US stockpile to industry in recent months.

From the UK there had been no hint of any release of nickel from reserve supplies. It has therefore been a considerable surprise to learn of the Board of Trade's announcement this week that it is to release 1,600 tons of nickel pellets from its stockpile, through the agency of the Mond Nickel Co., for use in the LIK

No criticism of this move is offered since UK nickel demand is still very great. This additional quantity—equal to some 7 per cent of UK annual consumption—can easily be taken up and more besides.

The BoT's reason in releasing nickel is that the reserve supplies built up as a defence measure are more than sufficient and it is selling in accordance with the Government's policy of running down strategic reserves of raw materials, thus reducing also defence expenditure. This is unlike the US policy in releasing nickel, which was to relieve the tight supply position and, in ceasing to accept further deliveries for stock-

piling, to allow the metal to be diverted to industry.

It is not known when the BoT acquired its stockpile of nickel or how much it holds. The amount released is less than the equivalent of one months' UK domestic consumption (at present about 22,000 to 23,000 tons annually).

Although the decision to reduce nickel seems fairly obvious, there is no doubt that future availability of supplies has been taken into consideration. This would seem to indicate that the BoT is confident that it will be able to buy later if the need arose to add to its stocks.

By the early 1960's, if all the nickel-mining industry's expansion plans are put into operation, nickel supplies should be very much more plentiful than at present. In the US, it should be noted, International Nickel's recent offer of large quantities of nickel, to be delivered shortly after 1960, has been refused.

Present methods of stockpiling are not making it easy for nickel producers to forecast prospective demand. If the present policy of diverting nickel from stockpiles is continued, it would be welcomed no less by the producers than by the industries requiring the metal, since a more concrete estimation of nickel demand would overcome what is likely to be a painful transition period for the producers some four years hence. (See also p. 262 this issue.)

DSIR PROBLEMS

WHEN details of the decisions were reached about economics in Government expenditure the Chancellor of the Exchequer included a reduction of £150,000 in the estimated net expenditure of the Department of Scientific and Industrial Research for 1956-57. While this represents about 2 per cent of the net vote and is proportionately less than the economies imposed in many other directions, there can be no doubt that it should be deplored. It is perhaps some consolation to know that the effect of this reduction in income will not stop the DSIR programme of planned expansion and development but it is reported by the Advisory Council that it will slow it down.

Most of the Department's expenditure involves either directly or indirectly the use of technical and scientific manpower and it is obvious from the Council's remarks and from perusal of the Department's reports that the available resources in scientific manpower are far from sufficient to meet all DSIR needs. Thus one reads that the amount of research work planned for the year has in some sections been affected by staff shortages. An increase of 276 in DSIR staff in 1956 is stated to be a marked improvement compared with 159 for the previous twelve months and 'a large part of the deficiencies which had accumulated during the two

preceding years has been overtaken'.

Obviously, until the lack of scientific personnel and shortage of money for this Government Department are overcome, the demands made on DSIR must continue to exceed its resources. The best use must in the meantime be made of the already available resources.

It is hoped that the new organisation of the DSIR, as a result of last year's DSIR Act, namely, the replacement of the Advisory Council by a Research Council, although similar in many ways to the old, will nevertheless be free not only to advise but to act.

Undoubtedly, the scientific effort expended in various directions could not previously be adequately supervised, nor could priorities be assessed and resources available used most effectively. The power to appoint committees with members co-opted from outside the Research Council membership should prove invaluable for this purpose.

In the meantime careful deployment of scientific manpower in DSIR will be necessary, and it is to be hoped that co-operation will be sought from industry and that technical staffs from member firms will be allowed to work at the various associations as they have on several occasions recently.

SHORTAGE OF SCIENTISTS AND FUNDS REPORTED IN DSIR ANNUAL REPORT

AR from sufficient scientific manpower in the UK to meet all available needs of industrial research is the reason given by the Department of Scientific and Industrial Research in its Annual Report for 1955–56, for the failure to get everything done that seems fully justifiable. The report was published (8 August) as Command No. 213 by HMSO, price 9s 6d (\$1.70 US), by post 10s 1d. It contains the last report of the Advisory Council, which is now succeeded by the Research Council under the DSIR Act 1956. Emphasis is laid on the fact that it in no way reflects results of the passage of the Act or of the deliberations of the new Council.

As in previous years, the largest part of the report is devoted to accounts of items of research selected from the programmes of the department's research establishments, and of summaries of the work of the grant-aided co-operative industrial research organisations. Appendixes to the report give a summary of the department's expenditure during the year (appendix IV), details of maintenance allowances paid to postgraduate students (appendix VII) and grants for special research in universities Publications by the (appendix VIII). departmental establishments and research associations are contained in appendix IX.

Increased Budget

Despite an increased budget for the year to 31 March last to £7,552,100, an increase of over £1,023,940 compared with the previous year, two new building projects on which work was to have begun were delayed owing to Government retrenchment decisions (namely, a reduction of £150,000 in the department's estimated net expenditure in 1956-57). These were an experimental road system designed as part of a new Road Research Laboratory at Crowthorne, Berkshire, and a new chemistry building at the Building Research Station, Watford.

Some £115,000 was allowed for grants to research associations; £99,000 for scientific grants (including postgraduate scholarships); £428,000 for departmental research and £410,000 for the UK's subscriptions to the European Organisation for Nuclear Research. Of the £428,000 mentioned for departmental research, £255,000 was for the estimated cost of staff in DSIR's establishments. After allowing for all this steady progress is reported along the path laid down in the five-year plan.

Referring to DSIR's contribution to economy in public expenditure, the Advisory Council state that although the effect has not been to stop the programme of planned expansion and development, but only to slow it down, the Council deplores the reduction. It remarks, however, that it would be a misunderstanding to say that it is intensely dissatisfied with a position which could be readily remediable by the allocation of additional resources. It does not deny discontent with the volume of resources available to meet the legitimate claims of DSIR's work but recognises that there are many other claims on money and

men. The Council states that '... we must and do accept that we cannot expect to see everything done which we believe to be fully justifiable when looked at from a limited departmental standpoint. It would be otherwise if there were available a body of unused scientific resources!'

Total staff of DSIR of all kinds on 1 October 1956 was 4,655 (including 200 part-time) as compared with 4,379 (including 190 part-time) a year earlier. The increase of 276 is stated to show a marked improvement and a rate considerably in excess of the target of 200 per annum embodied in the five-year plan.

Discussing scientific grants, the Advisory Council state that for some years the DSIR has been providing resources needed in various universities for nuclear physics research, including especially the heavy and unpredictable cost of running large machines for accelerating nuclear particles. The position has now been reviewed and after discussion with the university grants committee it has been agreed that the DSIR would continue to provide support for certain machines on a year to year basis. This support, however, will be confined to the maintenance of the machines, the provision of technicians and the cost of electric power, cooling water and refrigerants. The cost of research becomes the universities' responsibility.

Details of a number of new projects which are to be undertaken by DSIR are given in the report. Also dealt with are the taking over of responsibility for post-graduate awards in science and technology, made at present in England and Wales by the Ministry of Education and the Local Ministries, and the administration of the National Science Lending Library which is in the process of formation.

Investigations in many different fields of

industrial science are described. These include the development of a number of new devices for use in measurement and control equipment for industrial machinery as well as research into the basic processes of dyeing man-made fibres for textiles. The department is also exploring the possibilities of a new cheap type of high performance, high temperature resistant ferritic steel. Development work on a fuel cell for storing the electricity produced in power stations until it is required, is now complete. The cell is now ready for industrial development.

Included in the research programme of the food investigation organisation has been the use of antibiotics in fish preservation. Results of experiments on a semicommercial scale on trawlers have been considered sufficiently encouraging to justify the continuation of the work (See p. 250).

The Research Association of British Paint, Colour and Varnish Manufacturers is using the cobalt-60 source installed at the research station to determine the effects of high energy gamma radiation on a wide range of materials of significance in the preparation of paints and on the finished products.

The amount of work planned for the year by the research council of the British Whiting Federation is stated to have been affected by staff shortage. Nevertheless, encouraging developments of economic significance are said to have taken place. A pilot plant for a new method of air classification of whiting has started showing promising results. Process BP No. 721,467 developed by the laboratories for surface coating of whiting is being taken up commercially and the oleophilic product has been used as a filler in plastics, in preference to imported materials.

Included in this DSIR annual report are selected items from the work in progress at the Chemical Research Laboratory, the National Physical Laboratory, Water Pollution Research, etc. The annual reports of these establishments have been reviewed in CHEMICAL AGE.

Allied Chemical Develop New Polythene

A NEW type of polythene has been developed in the US by Allied Chemical and Dye Corporation particularly for the manufacture of pipes. Known as A-C Polyethylene pipe compound, it is produced by a low-pressure process at the Semet-Solvay Petrochemical Division of Allied Chemicals. This process is stated to be different from any known method and yields a polythene with physical properties that are different from and superior to competitive materials.

Properties include high bursting strength and resistance to impact, heat, chemicals, organic solvents and other hydrocarbons, due, it is claimed, to the high molecular weight and unique structure of the new polythene.

The high molecular weight (>750,000) is described as being higher than that of available Ziegler-type polythene. Crystalline melting point is 257°F and brittle temperature is below -120°F. Tensile strength of

this polythene is quoted at 3,480 p.s.i., at 75°F—20"/min. CHS. Elongation, at 75°F is 600 per cent. Impact strength at 75°F—ft., is 12½ lb./m. notch.

Pipe is now being extruded from A-C Polyethylene by Orangeburg Manufacturing Co. Inc., US, and is being marketed under the trade name Orangeburg SP Plastic Pipe.

Compared with standard high pressure polythene pipe, the new pipe material is said to have greater tensile and yield strength, higher heat and chemical resistance, and a substantially lower rate of creep. The pipe is, however, less flexible than standard grades, although it can be coiled and is easily laid. To give the pipe maximum resistance to ultraviolet rays it is compounded with 2½ per cent carbon black.

Further information is available from Kingsley and Keith Ltd., 110 Victoria Street, London SW1.

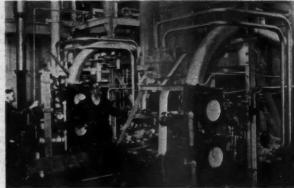
OPENED BY DUNLOP

AST week the Dunlop Rubber Company opened its 95th factory, the £35,000 compositions division at Castle Bromwich, Birmingham. Situated opposite the BIF building in Chester Road the new plant is designed to cope with the ever increasing demands of industry for adhesives and latex compounds. The factory can produce 2,000,000 gallons of adhesive a year and, when further extensions have been made, a further 1,750,000 gallons of latex compounds and reclaim dispersions will be produced.

The contemporary-style buildings consist of a two-storey laboratory and office block, a large canteen, and a factory block. Mr. S. Bentley, architect to the Dunlop Rubber Co., designed the factory roof entirely with tubular members, affording an unsupported span of 90 feet. The main contractors were George Wimpey Ltd., and James Smith Ltd., of Birmingham.

In designing the laboratories, future expansion has been borne in mind. Staff for the laboratories comprises a team of 30 scientists, technologists, and assistants, which is backed by the Dunlop Research Centre a mile away where the fundamental aspects of research are handled. The work of the laboratories is divided into two groups, latex and adhesive, and emulsion polymerisation. The latex and adhesives team is led by Mr. H. Chard, B.Sc., who joined Dunlop in 1951 and the Polimul team by Mr. J. B. Crofts, who worked at the Paint Research Station, Teddington before joining Dunlop last year.

Work at present under investigation in the adhesives laboratory involves applications of thermoplastic adhesives the latest of which is in conjunction with diathermic trim, for use in the car and coachbuilding industry. These and other adhesives used in the manufacture of door casings, upholstery, and draught excluder tube, are developed and tested in this laboratory. Chemical and physical tests are also carried out on latex dipping compounds, used for such items as fabric-based rubber gloves, and on the pile locking efficiency of latex backed carpets. Pressure sensitive adhesives for cellulose tapes, abrasive discs and window bills, and adhesives for self-



A processing vat at the new Chester Road factory

seal envelopes, cartons and tape are also developed and tested. For the building industry the compositions division produce and test adhesives for wall and floor covering materials, acoustic tiles, and synthetic laminates.

The Polimul laboratory is devoted to the study of polyvinyl acetate, the basic binding medium for emulsion paints. The vinyl acetate is bought by Dunlop from Germany, and processed by them. As well as its use in paint manufacture, Polimul can be used as a ground coat for strengthening paper so that it may be heavily embossed and also as a waterproof coating for kitchen and bathroom papers. Another application is the heat sensitive paper coating of thermo-adhesive labels. Polimul as a size binder and starcher is used as a carpet size, as a binder for sound insulations, and as a textile starch. It can be used both as a permanent starch and as an anti-snagging agent for nylon stockings. Also contained in the emulsion polymerisation laboratory is a small bench reactor, simulating one of the 700-gallon reactors in the factory and several testing machines, including a wet scrubbing machine for paint samples.

Another room in the laboratory block contains a pilot plant. This comprises a rubber mill, a three-roll paint mill, several machines for the manufacture of experimental solutions, a Hobart mixer for experimental latex foam work and a newly developed machine for backing tufted carpets with latex solutions. Throughout the building extensive use has been made of coloured Polimul paint, and Dunlop have painted the asbestos sheeting outside the factory building with this

plastic paint. An area of 33,000 sq. ft. in the factory building is devoted solely to the production of adhesives. It is planned, however, to build another plant in due course for the manufacture of latex compounds and reclaim dispersions which are at present produced in Fort Dunlop. Over 100 types of adhesives can be produced by batch production methods and Dunlop are constantly extending their range.

In a speech opening the factory, Mr. N. Bassett Smith, general manager of the composition division, stressed the ever growing use of adhesives and latex compounds. He recalled the beginnings of the division in 1946 when solutions for the car industry alone were produced, 'in a small corner of Fort Dunlop with a handful of staff' and compared it with the position today, when over a hundred personnel are engaged on a multitude of products.

SCI Conference on Carbon and Graphite

A THREE DAY conference on Industrial Carbon and Graphite is being organised by the Society of Chemical Industry and will be held on 24, 25 and 26 September at the William Beveridge Hall, London University, London WC1.

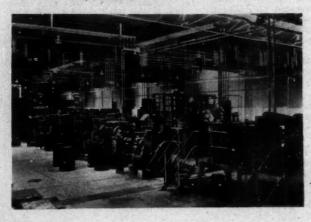
More than 50 papers have been submitted by British and overseas Government departments and by industry. Because of the large number of papers and the need for adequate discussion it has been decided to summarise the papers in selected groups in the form of preprints.

A free exhibition of carbon and graphite will be held in the department of chemical engineering, University College, Gower Street, London WC1, during the period of the conference.

Application forms for registration can be obtained from the Assistant Secretary, Society of Chemical Industry, 14 Belgrave Square, London SW1, or from the Honorary Secretary of the Conference Committee, Mr. E. A. Smith, Acheson Industries (Europe) Ltd., 18 Pall Mall, London SW1.

UK Agents Not to be Used

The Solartron Electronic Group Ltd., Thames Ditton, Surrey, will no longer sell through agents in the UK. All future enquiries should be sent to the group at the Thames Ditton headquarters.



The solution manufacturing plant at Dunlop's composition division

INDIA PLANS EXPANSION OF PLASTICS INDUSTRY

Symposium to Discuss Problems

TEN-FOLD expansion of the Indian polymer industry is planned during the second five-year plan to meet the increasing demand for a variety of high polymers for industrial development. The plans for the plastics industry include the establishment of a plant for the polymerisation of styrene monomer, two units for the manufacture of polythene and one unit for the manufacture of p.v.c. from acetylene. As well as this, proposals are under consideration for the indigenous manufacture of urea-formaldehyde moulding powders and other products.

The present imports of synthetic resins and moulding powders amount to about 7,000 tons a year. Already about 900 tons of phenol-formaldehyde moulding powder are being manufactured annually in the country. During the second plan period a target of 13,000 tons of various moulding

powders has been aimed at. The annual production of plastics goods. which rose from Rs.3 crores in 1951 to Rs.8 crores in 1956, is expected to reach Rs.15 crores by 1960. A synthetic rubber plant at an estimated cost of Rs.1.2 crores is projected by the Government and the possibilities for the manufacture of styrene monomer at the Rourkela Steel Plant are being explored. The Rubber Board has an ambitious plantation scheme for raising the present indigenous production of natural rubber from 24,000 tons to 32,000 tons by 1966 and to 52,000 tons by 1975.

Similarly, the present daily production of 43 tons of viscose is likely to be stepped up to 165 tons a day or about 132 million lb. annually. The utilisation of the byproducts of petroleum refineries for the manufacture of polymers is also being examined.

Plastics Symposium

The attainment of these objectives would require the closest co-operation between research and industry. To review the recent developments and to discuss the problems and prospects of the industry, a four-day symposium was organised at Poona by the National Chemical Laboratory and the Plastics Research Committee of the Council of Scientific and Industrial Research during March 1957. The symposium was inaugurated by Professor M. S. Thacker, director-general, Council of Scientific and Industrial Research.

Sixty papers dealing with the following aspects of the subject were discussed: Surface coatings; ion exchange; rubber, adhesives and moulding powders; fabrication techniques; cellulosics; kinetics; and solution properties of polymers. A separate session was devoted to a general discussion on the role of research in industry and raw materials for the plastics, rubber and synthetic fibre industries.

Polymers and copolymers of styrene suitable for use in surface coatings have been prepared at the Department of Chemical Technology, University of Bombay. Low molecular weight styrene polymers for surface coatings are produced by the polymerisation of styrene in the presence of turpentine (10 parts) at 165-70°C. for 24 hours in an atmosphere of carbon dioxide. In certain cases benzoyl chloride (about 0.3 per cent) is used as a catalyst. The modified styrene surface coatings have shown good resistance to water and alkaline solutions.

Cashew resins have of late assumed considerable importance in surface coatings because of their excellent film-forming properties and resistance to acids and alkalis. Compositions prepared at the National Chemical Laboratory from cashew nut shell liquid have given good performance as surface coating materials.

INDIAN

NEWSLETTER

Turpentine resin obtained by the polymerisation of Indian turpentine at 150°C. using perchloric acid or aluminium chloride as catalyst has been investigated with regard to its suitability for use in surface coatings. The solid resin (m.p. 86°C.) has been found to give excellent results both in spirit and oil varnishes.

The use of kamala seed (Mallotusphilippinensis) oil as a raw material in the preparation of paints and varnishes has increased considerably as a result of investigations carried out at the National Chemical Laboratory. Varnishes based on modified kamala seed oil have higher gelling time (9-12 min.), hardness and good keeping qualities. The modification of the oil is carried out by alcoholysis with butyl and amyl alcohols in the presence of 10 N alcoholic hydrochloric acid.

Surface coating films based on hydrolysed lac have been found to acquire good physical properties after baking at 150°C. for 3 hours. The films possess rockwell hardness of 65-70 and scratch hardness greater than 1,000 g. They are unaffected by water, 5 per cent sulphuric acid and usual organic solvents. Hydrolysed lac is prepared by hydrolysing seed-lac with aqueous caustic soda (4 per cent; 425 parts) followed by treatment with sulphuric acid (10 per cent; 215 parts).

Two cellulose ion exchange derivatives, Ecteola and Deae, have been found suitable for purification of red protein from cobalamine protein complex by passing the latter through a chromatographic column of the cellulose resin. The purity of the protein has been confirmed by spectrophotometric and electrophoretic studies of the resulting products.

The preparation and prospective uses of a number of cation exchange resins were discussed. The resin obtained by treating cashew nut shell liquid with sulphuric acid or chlorosulphonic acid has been found to be of use for treatment of brackish waters to make them potable and for softening water for laboratory use.

Recent developments in ion exchange membranes have led to new applications of ion exchange resins. Ion exchange membranes have been used successfully for the removal of salts from water, recovery of organic acids from their salt solutions and for separation of mixtures of amino acids. The construction and use of an electrodialysis cell based on ion exchange membranes was discussed.

Ion exchange resins are being increasingly employed in the sugar industry for the treatment of sugar solutions, where they serve a dual purpose. They prevent scale formation and render the solution less viscous, making filtration easier. The use of highly porous, strongly basic resins was recommended to replace activated carbon in removing colouring matter from sugar

The effect of exposure of crepe rubber to gamma radiation in carbon tetrachloride solutions has been studied at the National Chemical Laboratory. The irradiation creates active centres which cause the molecules to react with similar or dissimilar molecules and form cross links. The formation of cyclised rubber is shown by the pronounced fall in viscosity of the solution. A new method has been worked out at the laboratory for the incorporation of cyclised rubber into natural rubber. The physical properties, viz., abrasion resistance, hardness and modulus of elasticity of such mixes when suitably compounded and vulcanised, increase with increasing proportions of cyclised rubber.

Liquid or depolymerised rubber mixed with solid rubber, waxes, resins, etc., finds a number of applications for making rubber goods like printing rollers, electrical potting components, prototype components, adhesives, gaskets and linings. Controlled thermal degradation of rubber yields a new, less viscous form of liquid depolymerised rubber which is easier to cast and is more suitable for the manufacture of soft and ebonite articles.

Moulding Powders

Urea formaldehyde moulding powders using sawdust as filler give products which compare favourably with the imported material. Deodar (Cidrus deodara) sawdust has been found to give better tensile strength while saimal (Salmalia malbarica, Bombax malbarieum) sawdust makes for better bending strength.

Methods developed at the Shri Ram Institute for Industrial Research, Delhi, for the production of raw materials for the plastics industry, namely, acetylene, ethylene, acetaldehyde, vinyl chloride, etc., were discussed. An improved process for the gaseous phase dehydrochlorination of ethylene dichloride for the preparation of vinyl chloride was also reported.

P.v.c. has been produced on a bench scale



Professor Thacker opening the exhibition of plastics, rubbers and synthetic fibres at the National Chemical Laboratory, Poona, India

at the National Chemical Laboratory, starting from alcohol. The molecular weight of the polymer produced was reported to be within about 10 per cent of that of a standard imported variety. An integrated pilot plant with an estimated capacity of 8 to 10 lb. an hour has been designed and is under erection. Reinforcing carbon black has also been produced on a pilot plant scale by the furnace process using oils supplied by the refineries in Rombay.

Mention was made of polythene's use in the electrical industry as an insulating material for high frequency cables, television and radio frequency cables, carrier telephone cables including submarine cables and radar. Because of its toughness, high resistance to water vapour and chemicals, and low temperature flexibility, polythene is finding use as a packaging medium in India.

Gelatin would be an ideal substitute for plasma if it could be made in a form which is less viscous and has a low gelling temperature. Two modified gelatins (MG6 and MG7) suitable for transfusion and free from viscosity defects have been prepared by a new enzymic method at the National Chemical Laboratory. The merits of the modified preparations as compared with other plasma substitutes available in the market were discussed at the symposium.

Synthetic resins have been used in the leather industry to improve certain characteristics such as feel, fullness, resistance to wear, water, etc., and also for bonding of leather to leather or to utilise the leather waste in the manufacture of leather boards. A majority of the polymers that go into the making of leather are at present being imported. Investigations conducted at the Central Leather Research Institute indicate that polymers for the leather industry can be produced in India.

refrigeration, carcases deteriorate rapidly, whether chlortetracycline was used or

A specialised study of the phospholipids is in progress at this station. A reasonably complete analysis of the main components of egg phospholipids has been carried out using the silicic acid procedure and an improved alumina column technique. Attention is now being directed, in collaboration with the National Institute for Research in Dairying, Shinfield, Reading, towards an application of similar methods for examining the phospholipids of milk.

Studies have been resumed on the application of antioxidants to fats and foods. The flavonols gossypetin and quercetagetin have been shown to be potent antioxidants for methyl linoleate; the former is stated to be several times as active as the widely used propyl gallate. Tests are continuing to be made on the catalytic decomposition of ozone with a view to destroying completely any excess in the reactions involved with ethylene. reaction between ozone and ethylene is being examined, it is reported, with a view to using the reaction as a means of estimating ethylene, as formic acid, on board ship, particularly in banana spaces.

In the fruit, vegetables and plant products division, investigations reported last year (1955) on the coupled oxidation of β-carotene by a lipoxidase-linoleate system have been continued. It has been shown that there are two types of products, oxides and compounds, which arise by scission of the long-chain double-bond system and which probably contain a ketonic carbonyl group.

Work on methods of suppressing the sprouting of potatoes referred to in the previous report showed that the introduction of nonyl alcohol among the stored potatoes was both simple and effective on a small scale. The method is now being tried on a much larger scale at

Sufton Bonington.

DSIR Board Studies on Antibiotics and Antioxidants

ONE of the difficulties of food research is the tremendous width of the field to be covered. Careful selection is, therefore, essential. It is also necessary to resist the temptation to follow unduly leads which arise logically in the course of food research, but which are more appropriately the concern of other organisa-These remarks are made by the Food Investigation Board in their report for the year 1956, published on Tuesday this week by HMSO for DSIR. (Price 3s 6d (63 cents for US) by post 3s 9d).

Action has in fact been taken by the Director of the Board to make items of the research programme more specific in character and with clearly defined objectives. Arrangements have been made, therefore, to pass over to the Chemical Research Laboratory some of the research originating in the Low Temperature Research Station on electrodialysis.

The Board report that they are satisfied that in the various commodity divisions of the organisation as well as the Low Temperature Research Station a proper balance of fundamental and applied work is being maintained. A feature of the basic work which is emphasised is that much of it has a bearing on several types of food product.

In the technical summary of the report, foods to which the researches relate are fish, meat, poultry, eggs, fruit and vegetables; preservative treatments now include treatment by irradiation, and the use of antibiotics.

Preservative ices have been studied for fish and fish products. Reference is made to confirmation by laboratory experiments of Canadian and other claims as to value of chlortetracycline as a preservative for fish. In vitro tests have also indicated that a diguanidine compound (1:6 di 4: chlorophenyl-diguanido-hexane) and a quaternary ammonium compound (di-ndecyldimethy ammonium bromide) are almost as effective against pure strains of fish spoilage bacteria as chlortetracveline. When incorporated into ice, several experiments showed that they were inferior to chlortetracycline even at concentrations five to 30 times as great. Oxytetracycline was found to be as active in extending the storage life of UK species of fish as chlortetracycline, while one or two other compounds (neomycin, polymixin and several new antibiotics) are stated to have shown sufficient promise to warrant further laboratory trials at the earliest opportunity.

Experiments with cod stored continuously in ice containing 5 p.p.m. chlortetracycline indicated that most of the antibiotic was concentrated in the skin (3 to 11 p.p.m.) less than 1 p.p.m. being present in the flesh. After cooking (steaming) no antibiotic could be detected even in the skin but a residue of 4 p.p.m. in the skin was detected after deep-fat frying (7 to 10 minutes at 250°C (482°F).)

Use of chlortetracycline dips for checking deterioration during storage of eviscerated poultry has been studied at the Low Temperature Research Station at Cambridge. Added to slush ice (10 p.p.m.) with subsequent storage at 1°C (33.8°F) for 22 days, satisfactory results were obtained. The corresponding time when no antibiotic was used was 12 days. Without

Bolton to Make Air Pollution Tests

THE HEALTH DEPARTMENT at Bolton, Lancs, where the rate for chronic bronchitis is the second highest in the country, is to make air pollution tests. Special recording apparatus is to be installed at nine points in the town to measure the amount of smoke and invisible chemicals known to be chest irritants and to cause cancer in animals. Daily results will be analysed. The scheme, the first of its kind in the country, is expected to last at least a year.

Mr. Thomas Williams, chief public health inspector, said on 28 July: 'We want to find where the high levels of pollution are and then to reduce them. After the department has done the field work it may be possible for medical research to follow.

Pharmacists' Visit to Britain

Pharmacists from Australia, Colombia, Denmark, Eire, Holland, Kenya, Kuwait, Pakistan, Singapore, Sweden and USA are coming to Bristol for next month's British Pharmaceutical Conference.

Chromatographic Determination of Micro-amounts of Metals

By A. Lacourt and P. Heyndryckx

A SIMPLE TECHNIQUE for precise determination of minute quantities of cobalt, copper and zinc has been described previously in this journal (1, 2, 3). The procedure is as follows:

(1) A known volume of the solution is spotted on filter paper (humidity of the paper must be checked) and kept for 10 minutes at 40°C

(2) The spot is coloured by spraying with the necessary reagents and the paper is kept at 40°C for a further 10 minutes (the time at the end of the spraying should be noted).

(3) The filter paper bearing the spot is introduced, with water, into a Beckmann cell, so as to bring the coloured area in front of the window. Absorption is then measured, after waiting for 30 minutes, y setting the apparatus on zero of optical ensity on a filter strip sprayed with all the reagents used and treated in the same manner as the spot.

The originality of this technique lies in the fact that water ensures good transmission of light and transparency of the paper. Blank values are calculated at 0.125 optical density units with a reproducibility of 0.8 per cent.* One total reading of the absorption of light through the whole coloured spot surface eliminates irregularities of transparency appearing which otherwise occur when each millimeter of the paper is scanned.

Results require no calculation since they are read directly on the dials in optical density units or in transparency percentage.

This determination, without any modification, can be used for any chromatographic spotting; the chromatograph is applied as outlined in (1) and (2) above.

Practical Difficulty

The technique described above requires a different complexing reagent for each element. This can become a practical difficulty in the case of chromatographic research work, where spot location is unknown; it is then apt to lead to spraying and cutting errors and to losses of chromatograms for quantitative purposes. This loss of time, work and material can be avoided if one spraying agent can be recommended for all spots of the chromatogram.

Such is the case when using 8-hydroxyquinoline in acetone-acetic acid solution. In spite of its being, in the cases studied, neither a good quantitative or qualitative reagent, nor a specific one, this spraying reagent has proved to be a very good spectrophotometric complexing agent for cobalt, copper, zinc, cadmium, lead and barium determinations on paper.

Standard conditions for spectrophotometric measurements of the spots do not differ from the previous ones. As photometric stability of the studied oxinates

fades after 60 minutes, absorption readings should be taken 30 minutes after the end of the spraying. Results are proportional to element concentration in the coloured spot. The units observed are converted into micrograms using a calibration graph established for each element. Each of the elements studied has its own individual graph. The diffusion factor of the complex in water is very slight.

Using the above technique it is possible to determine very small quantities. The actual limit attained is 0.03 microgram for cobalt and copper and 0.02 microgram for zinc. The following table III summarises the results for 0.1 microgram of each of these elements.

Good reproducibility, amplification and distinct absorption values for each of these six elements, under uniform conditions, have been obtained. It is considered that this may be the basis of a typical quantitative microtechnique of general character which is likely to lead to interesting developments. It certainly answers the present urgent demand for a more rapid, accurate (4) and sensitive ultramicromethod of determination of trace elements in research work.

REFERENCES

- (1) Lacourt, A., and Heyndryckx, P., CHEMICAL AGE, 1955, 72, 1421.
- (2) Id., ibid., 1956, 74, 1225.
- (3) Id., Microchem. Acta, 1955, 1, 62; 1956, 9, 1389; 1956, 11, 1621 and 1686.
- (4) Genevois, L., Rev. gen. Sci. pur. appl., 1955, 62, 351.

TABLE I

Spot Concentration Measurement for Cobalt, Copper and Zinc

(Optical Density Units)

	Unchromatogr	aphed element	Chromatographed element			
micrograms	Cobalt	Copper	Zinc	Cobalt	Copper	Zinc
3	0.0501	0.2385	0.185	0.0640	0.2453	0.2004
2	0.0358	0.1649	0.1351	0.0510	0.1724	0.1538
1	0.0209	0.0904	0.0855	0.0377	0.0978	0.1055
0.1	0.0091	0.0243	0.0411	0.0267	0.0296	0.0606

TABLE II

Quadratic Mean Errors

(Percentage in Units of Optical Density)

	Unchromato	graphed element	Chromatographed element			
micrograms	Cobalt	Copper	Zinc	Cobalt	Copper	Zinc
3	1.3	0.5	0.13	0.47	0.09	0.09
2	2.0	0.4	0.16	0.39	0.15	0.11
1	3.4	0.8	0.58	2.10	0.22	0.18
0.1	14.0	4.5	0.68	0.90	1.08	0.29

TABLE III

Direct Spectrophotometric Spot Measurement for Six Cations

(O.I microgram)

Element	Initial working conditions and results	Scandardised working conditions and results
0.1 με	Tungsten lamp Red phototube Varying sweelength Varying slic Varying reagent according to element	Hydrogen lamp Blue phototube Only one wavelength: \$\lambda = 360 m\tau\$ Only one site: Only one reagens: \$\lambda - \text{ydroxyquinoline}\$ (150 mg oxine, 0.5 ml acetic ac. \(\lambda_0 \) acetone)
Cobalt	λ = 850 m/μ; F = 0.040 mm alpha nitroso beta naphthol absorption: M/18 = 0.0091 O.D.U. reproducibility 14%	absorption: M/I8 = 0.0910 O.D.U. reproducibility 0.83% amplification: x 10
Copper	$\lambda=660$ m μ ; F = 0.095 mm rubeanic acid absorption: M/18 = 0.0243 O.D.U. reproducibility 4.5%	absorption: M/I8 = 0.0770 O.D.U. reproducibility 0.93% amplification: x 3.1
Zinc	$\lambda=520$ m μ ; F = 0.28 mm dithizone absorption: M/18 = 0.0411 O.D.U. reproducibility 0.68%	absorption: M/I8 = 0.0981 O.D.U. reproducibility 0.67% amplification: x 2.4
Cadmium		absorption: 0.036 O.D.U.
Lead		absorption: 0.048 O.D.U.
Barium		absorption: 0.088 O.D.U.

^{*} Whatman No. 4 paper in strips of 1 cm by 10 cm.



PAINT manufacturers are becoming increasingly interested these days in the use of weatherproof plastic emulsion paints. There may be those who still doubt that such paints can ever be suitable for external use. Alembic suggests that next time they are in Birmingham they examine the exterior paintwork on Dunlop's new composition factory in Chester Road, and see for themselves how this company's new plastic emulsion Polimul-based paint is standing up to the vagaries of Midlands' weather.

ICI's announcement of their £100 million Avonmouth development scheme has been associated by chemically interested parties with the recent news that this company has negotiated to purchase the bulk of Sir Richard Brooke's Norton Estate, between Runcorn and Stockton Heath, Cheshire. Size of the estate is some 1,000 acres. It is being suggested that there is every likelihood that within five years ICI will begin work on a 'third Wilton' at a further new site and that this site will be the Norton estate.

At the time of the purchase of the land, however, it was stated that the company had in mind a long-term scheme of development, certainly well over the five years hence now being suggested. That development of the Cheshire site would be very long term was again stressed when Alembic sought an explanation of the company.

SULPHUR trioxide is considered to be the component partly responsible for the persistence of the chimney plume. In his annual report as the Medical Officer of Health, Liverpool, Professor Andrew B. Semple, Alembic notes, gives the results of work being carried out at Florence Dock Power Station, Liverpool, on the determination of acid dew point of flue gases which come from pulverised fuel plant. Measurement of this factor gives some indication of the sulphur trioxide content of the gas.

Experiments have shown that it is possible to depress the acid dew point of flue gas from a boiler by introducing zinc oxide with fuel. The action here is that the zinc oxide neutralises the sulphur trioxide content of the flue-gas by combining chemically to form non-corrosive compounds which are carried away with the gases.

With heavy additive injection, according to Professor Semple, the emission of solid particles from the chimney stack could increase considerably. Sizing of the zinc oxide is of the order of 25 microns or less.

This increase in solid particles is reflected by a considerable increase in condensation of water vapour, the acid dew point at this time being completely eliminated.

It was shown, in tests, that as the quantity of zinc oxide more nearly approached that required to first neutralise the acid constituents so did the intensity of the plume

Unfortunately the procedure used is not commercially practicable owing to the high cost of zinc oxide as an additive and also owing to the very considerable difficulty which would be experienced in exactly proportioning the additive to the amount of cool flow gas. Too much additive would be as bad as too little. In any case, Alembic agrees with Professor Semple that it is doubtful if any solid additive would be satisfactory. In the meantime further experiments to get rid of chimney plumes are proposed, this time using ammonia injected into the flue gases.

ALEMBIC learns that Mersey Docks and Harbour Board proposes to make a new bye-law to bring into effect a new schedule of charges for the master porterage of inward and outward cargo at the port. The new rates will apply to all chemical products for which there will be a basic rate, related on present-day conditions and not subject to any percentage addition.

Since 1924 varying percentage reductions and additions had been made to the schedule which at present is subject to an addition of 233 per cent.

In addition, the Dock Board has listed the following commodity differentials: alkali in bags 1s per doz, barytes in bags 1s, bleaching powder in bags or casks 1s, bone ash 1s, carbon black 11s, Keiselguhr in bags Is, acetate of lime in bags Is, acidulated lime in bags 1s, methylethyl ketone, in drums 2s 6d, muriate of potash 1s, nitre in bags or casks 1s, phosphorus in drums 2s 6d, plumbago in bags or casks 1s, red oxide of iron in bags or casks 1s, silicate in bags 1s, sodium carbonate in ordinary bags as distinct from waterproof bags 1s, sulphur, including brimstone and flowers of sulphur in bags or casks Is, tetra ethyl lead in drums 2s 6d.

DESPITE all the explosive and other hazards of chemical manufacture, the industry can compliment itself on a very high standard of accident prevention. Not so, it appears, the would-be chemist. For the annual report of the Inspectors of Explosives, published last week, issues a serious warning about the number of accidents, particularly to boys between the ages of 12 and 16, caused by experiments with chemicals.

Last year there was a 'regrettable increase' in the number of such accidents which caused injuries. Most of the explosives injuries were caused by boys who had bought chemicals and which they were mixing to make 'bombs' or other types of firework. One case quoted is of a boy of 14 making a 'bomb' with potassium chlorate and sulphur; this mixture exploded and as a result of injuries his hand had to be amputated. The inspectors were surprised to learn that the father requested the return of the chemicals which had been taken by the police, to enable his son to continue his experiments on his return from hospital!

ACCORDING to a recent market report on scientific instruments for Norway, there should be an expanding market in that country for scientific instruments generally and for industrial control instruments in particular. Alembic understands, however, that British instruments, once leaders in the field and, by and large, competitive in quality and price, are losing ground in this market to Western Germany.

Reasons given to Alembic for the UK declining exports are that British manufacturers of instruments are badly represented by agents who are not technically qualified and who cannot give the altimportant after-sales service, that British salesmanship in this market and discount terms are poor and that with few exceptions British manufacturers seldom visit the market. UK deliveries are also slower; six to 12 months, compared with Germany's three. The Norwegians thus reluctantly conclude that the British manufacturers, with whom Alembic is assured the Norwegians would prefer to deal, are not interested in the market.

Another point mentioned is UK sales literature, which, if not weak in quality, is certainly considered meagre in quantity. German sales literature, however, is stated to be lavish, while US manufacturers are commended for sending technical newsletters discussing particular problems and inventions.

RESEARCH instigated two years ago by the Steel Company of Wales is said to have led to the development of a method by which industrial gloves can be rendered sterile. Because of the possible dangers of infection by dermatitis or blood poisoning, the company did not favour the policy of reissuing laundered gloves.

The problem was taken to the Daffodil Laundry Co. Ltd., Gorseinon, who specialise in cleaning industrial clothing, and experiments began in co-operation with the British Medical Association. An approach was made to Heidelberg University to produce a formula which, used in conjunction with a carrying-agent and subjected to certain treatment, speedily destroyed all commonly-encountered germs in the gloves and rendered them sterile for a guaranteed period.

Alembic

PREVENTING ACCIDENTS IN CHEMICAL PLANT

I-Hazards to be Avoided

THE Chief Inspector of Factories, 1955, in his annual report for 1955, said that in recent years there has been a profound change in the chemical industry in the UK. The manufacture of heavy chemicals has increased considerably and there has been a tendency for this work to be concentrated in a small number of large factories controlled by large organisations. For example, very few gas works now distil tar or treat their ammonia liquors; instead, these materials are transferred to central tar distilleries or chemical works. The manufacture of acids and alkalis is normally carried on in large works. There has also been a considerable increase in the manufacture of fine chemi-

The fine chemical industry has grown owing to the rapid increase in the use of synthetic drugs and insecticides and to the fact that industry generally is now using many more chemicals to assist production and to improve products.

With the extended use of chemicals in all branches of industry, the hazards once associated with the chemical industry alone, can now be found almost anywhere. It is essential that managements of non-chemical works, and operatives, should always be aware of the dangers associated with the materials which they handle, and be trained in the precautions to be taken with these substances.

Fewer Reactions

The development of modern chemical processes and plant has in many cases, however, reduced the danger to persons employed, for a newly developed process often makes it possible to eliminate certain reactions which necessitate the handling of intermediate chemical products. There has been considerable development in the mechanical handling of materials and this has lessened the personal contact with corrosive and inflammable substances.

Common chemical hazards are presented in the handling of solid or liquid chemicals, dusts, gases or vapours, and contact between persons and the dangerous materials, may be external, by swallowing, or by inhalation.

There are many general statutory requirements which affect chemical works in common with all other factories and these regulations are detailed in the Factories Act 1937 and 1948 and the Chemical Works' Regulations 1922.

Safety measures always aim at preventing contact between the person and the dangerous material, but before using dangerous chemicals consideration should always be given as to the possibility of using a less harmful material.

Consideration should also be given as to the possibility of altering the nature of the substance, e.g. by wetting or damping to form a paste, if this will make its handling less hazardous. If these measures

are not practicable, then the ideal plant should be totally enclosed and materials should be moved by pump, conveyor, clevator, or gravity, in pipes or ducts. An additional means of removal of toxic material from the vicinity of the worker, in particular his face, is to provide an ex-

This article, which is presented in two parts, is a shortened version of a talk given recently by Mr. L. Jones, a departmental accident prevention officer at British Celanese's Spondon, near Derby, works, before the Trades Council in Derby. Part 1 deals with the dangers existing in chemical works. Part 2 discusses the precautions to be taken.

haust ventilation (with a fume cupboard where possible) and a good general ventilation.

External contact can occur in the handling of solid or liquid chemicals, for in many processes the plant cannot be totally enclosed and the man-handling of materials is unavoidable. Many chemicals, e.g. aniline, will pass readily through unbroken skin and cause poisoning and even death.

The hazards associated with such common chemicals as sulphuric acid, nitric acid, hydrochloric acid, caustic soda, etc., are well known; glass bottles of liquids should not be carried in the hand, but in stainless-steel wicker baskets, and carboys should always be in one of the special carriers, such as the Union carboy carrier. It is always safe practice to empty carboys by means of special pumps designed for this purpose, and air pressure should never be applied to a carboy unless a special discharger device is employed.

In warm weather, drums, especially of volatile liquids, may spurt when the bungs are unscrewed. This can be overcome by a bung having the middle portion of the thread turned off, or with a slot cut across which will allow pressure to be gently released before the bung is fully withdrawn. Liquids brought in bulk to the factory should be discharged through fixed pipelines using self-sealing couplings or flexible connections.

External contact can also result from leakage and as far as possible work should be kept away from underneath liquor lines. Drip trays should be placed under overhead plant containing corrosive liquids, and cocks liable to leak should be shrouded with lead and provided with leaden drip trays. On plant containing corrosive liquids under pressure, shields should be erected at pipe-joints and wherever leakage may occur to prevent liquid spurting a distance.

External contact can result accidentally from immersion in vessels containing dangerous liquor and all such vessels are required to be covered or securely fenced. The admission of liquor to a vessel into which a worker has entered can also result in external contact and, in general, all cocks should be locked in the closed position before a vessel is entered. Preferably, connections should be broken and blanked off.

Internal contact can be caused by the presence of toxic gases, sprays and dusts in the atmosphere, and a gas may be a 'surprise' or 'expected' gas. A 'surprise' gas not known to be present can be formed by contact between substances that may be harmless in themselves.

It is essential that steps be taken to prevent contact of persons with harmful gases or dusts, or where this is not possible to minimise contact so that no harmful effects result

As the presence of toxic substances in the atmosphere is always possible, arrangements are necessary to ensure that the presence of these substances can be detected, and where necessary their concentration determined. Considerable research has been made into the maximum allowable concentrations of gases which may be safely worked in, and in many cases safe working concentrations have been laid down.

Reliance should normally be placed on the design of the plant, or on local ventilation to prevent injury, but to increase the general ventilation is not entirely a suitable means of keeping a factory atmosphere safe to breathe, as those maximum allowable concentrations of poisons which may be safely breathed by persons are not known with precision.

It is usually quite impracticable to say at all times exactly what concentration a worker is breathing, as the concentration of poisons varies from time to time and place to place.

Toxic Actions

The effects of poisonous substances can arise as a result of their absorption into the body through the lungs, skin or stomach. The actions of toxic substances are either local, remote, or both, and they may function by destroying tissues with which they come into contact or by being absorbed into the general circulation, acting on organs remote from the point of absorption. A distinction should be made between acute poisoning and chronic poisoning.

It is always best therefore to deal with the poisonous substance at its source, and prevent it from dispersing into the factory atmosphere, but the disposal of exhaust furnes requires thought for it is a statutory requirement that many poisonous gases are scrubbed out before discharge to atmosphere, as a 'nuisance' may be created if this is not done. In the case of solvents, lead dust, etc., it may pay to recover the valuable material carried away by exhaust, and many chemical plants carry out this recovery process.

Apart from the health hazards met with in the handling of chemicals and dust, there are the ever-present fire and explosion hazards. Some chemicals are hazardous when dry, others when wet, some have fire risks if air or oxygen are present, others even in relatively inert atmospheres. The fire hazard can be almost entirely eliminated by correct handling.

Explosions are possible when the chemi-

cals handled give off an inflammable concentration of gas, or provide what is known as a dispersed system in which solids or liquids are formed into dusts or sprays respectively.

In view of the many dangers associated

in dealing with chemicals it is essential that precautions are taken by managements and workers alike and the following methods, whilst mainly being required by law, are adopted as a means of preventing injury to persons employed.

2-Precautions to be Taken

stances or dusts.

HERE there are strong acids or dangerous liquids used in a process, special protective clothing in the form of boots, gloves, aprons and goggles are provided and wherever practicable this protective clothing and appliances should be issued on a personal basis as this enables a better fit to be obtained, with a correspondingly higher standard of protection, comfort and hygiene.

When it is necessary to issue the equipment on a plant basis, arrangements are made for the clean storage of such equipment and its removal for maintenance and cleaning after use. Improvements are constantly being made in the design of devices for personal protection, and care should be taken at all times to ensure that the best available type is being used for any operation.

It is best to consult operatives in the choice of the type adopted in order to encourage an interest, and it is essential that the worker should receive full instruction in its use, be confident about its capabilities and at the same time realise its limitations.

To protect against dangerous dusts and gases there are many different types of breathing apparatus available and the choice of this equipment will depend upon the normal plant conditions, and any anticipated possible changes in the plant atmosphere, and the type of job being performed. All persons likely to use breathing apparatus are fully trained in its manipulation, and refresher training is given from time to time.

Apparatus must be regularly inspected to ensure its fitness for use. This is a statutory requirement.

Apart from the protection issued to workers it is necessary that equipment be provided and installed in prominent positions, for use during abnormal conditions, or an emergency. This equipment should not be a personal issue but for the use of any person called upon to act during an emergency and carry out rescue work if required. Operatives should be trained as to the action to be taken in an emergency and adequate warning should be given. It is a statutory requirement that a number of persons are trained in the art of rescue, and these persons should always be aware of the location of emergency equipment.

Types of breathing appliances used are the normal canister respirator which will filter low concentrations of many common gases. The canister-type respirator is not suitable for lengthy periods on process work and should never be used in confined spaces, where there may be a deficiency of oxygen, or for rescue work.

Self-contained apparatus is also available, where the wearer carries a cylinder of oxygen or compressed air which is fed to the face-piece. This self-contained breathing apparatus is ideal for rescue work and, although not normally used for routine

to be Taken
operations, provides protection against
high concentrations of poisonous sub-

Apparatus where the wearer is supplied with fresh air drawn or blown through a tube can also be used for work in confined spaces and in high concentrations of gases or dusts.

A newer type of compressed air hood has recently come on to the market which is suitable for use over a complete eight-hour working day. The hood, of plastic, gives a clear view, and is fed by fresh air pumped to the working area through pipework, from a special compressor.

Entry into vessels and confined spaces is covered by regulation 7 of the chemical works' regulations, and before entry is made into a confined space where there is reason to believe that dangerous gas or fumes exist, it is required that the vessel or space shall be examined by a responsible person and certified whether the place is, or is not, isolated, sealed off, and free from danger. Where danger exists, a breathing apparatus shall be worn and, where there are no obstructions, a life-belt. This regulation also requires that a man shall be stationed outside the tank or vessel to watch the person inside and take action if required.

Vessels, pipelines and any other plant or equipment which can be identified by the use of coloured paints are usually coloured to ensure that the nature of the contents of the pipes and vessels is apparent. It is essential that wall charts are exhibited to indicate materials represented by the colours on the chart.

As in the entry of vessels, it is essential to have careful checks made by a responsible individual and then to issue safety certificates when operatives are called upon to break open any pipework which has contained corrosive chemicals or any other dangerous substance.

It is essential that efficient fire-fighting appliances are available, and the choice of the many types of equipment always depends upon the type of material used, and the type of building or area in which a fire may occur. In common with all industries, fire detectors, automatic sprinklers, foam installations, hydrants, hose reels, etc., are sited at required positions and in a large factory it is essential to have a fire-fighting organisation. It is the general practice to instruct workers in the action to be taken in case of fire.

Ignition sources which cause explosions in the handling of inflammable substances or dusts are, usually, naked lights, smoking, bunsen burners, etc., hot surfaces, such as electric fires, steam pipes, etc., sparks from chimneys, engines, furnaces, and welding and cutting operations, electrical discharges and static electricity. These ignition sources must be eliminated or the hazardous materials used segregated from other operations.

Again, it is general to operate a scheme of clearance, whereby maintenance or repair work in any plant cannot be carried out unless a 'fire permit' or permit to work is issued certifying that conditions are such that there is no risk of a fire or explosion.

The use of special hand tools, made of non-spark materials, is general in plants dealing with inflammable substances, and electrical equipment fitted is required to be of a special flame-proof type, or gas tight.

Static electricity can be induced when there is friction; it may even build up when persons are walking on insulated flooring such as dry concrete, and in those plants where explosive dusts or gases from inflammable solvents are present it is general practice to earth the floor, if metallic, and earth all tanks containing solvent. Where dusts are handled in bins, the bins are made safe by the fitting of copper wires which contact earthing strips placed across the floor of the plant so as to discharge the static buildup to earth. When dusts are used in pipework, containers or conveyors, or even storage silos, it is common practice to blanket the dusts with an inert gas such as carbon dioxide or nitrogen.

Harmful Reactions

Many chemicals have a harmful reaction on the skin and such reactions can lead to some form of industrial dermatitis. Protection against these conditions is afforded by the use of protective clothing, various barrier creams or ointments, and the provision of adequate washing and cleansing facilities.

An ambulance room is required at every works employing over 250 persons and there are regulations concerning its use, size, lighting and equipment. A qualified nurse or first-aid attendant should be available during all working hours.

First-aid boxes or cupboards are generally sited at prominent places where immediate dangers exist and persons are trained and practised in first aid, these persons usually being normal shift or day workers. Where strong acids or dangerous chemicals are used a means of drenching the body in the event of bodily contact should be provided and eye-wash bottles, preferably of a type that a person can use himself, should always be at hand.

There is no blueprint for safety organisations, but every works should organise to fulfil its own particular needs, having a mind to its size, the hazards involved and the extent to which good relations have already been built up in the works. The Association of British Chemical Manufacturers recommends that consideration should be given to the appointment of a full-time safety officer in all chemical works employing 500 persons or more.

Works safety committees are usually established in large works, and departmental committees are also needed to break the safety work down, and achieve a sense of responsibility right down the line from the management to the worker.

In very large works, apart from a senior safety officer, part-time safety officers selected from among the technical staff may be appointed, and it is even common in a large department to appoint a full-time safety officer. In corporations which have

(Continued at foot of p. 255)

JAPAN REPORTS PROGRESS IN FIBRE PRODUCTION

JAPANESE PRODUCTION of rayon staple in 1956 was 682 million lb. which not only makes Japan the largest producer of this material in the world but also establishes a world record for any country. Sixty per cent of this rayon staple output is crimped, but demand for rayon staple of larger deniers and in longer lengths and also for hollow rayon staple is stated to be increasing steadily.

This statement is given together with interesting figures of output and comments on trends in wholly synthetic fibres in the annual publication of the Japan Chemical Fibres Association 'Rayon and synthetic fibres of Japan'.

Fibre Prod (in millio			
Viscose filament Cuprammonium filament	1955 159 14	Japan 1956 181 19	UK 1955 70
High tenacity viscose rayon Rayon staple Acetate filament and	21 531	22 682	73 227
staple	7	13	60
Total of rayon of all types	732	917	430
Nylon 6 (Perion and Celon) staple and fila-			
Vinylon (polyvinyl alco- hol) staple mainly, and	****	34	31
filament Others, mainly Vinylidene in Japan; mainly	35	24	3
Terylene and Ardil in	_	6	10
Total of synthetic fibres	35	64	41
		_	-
Complete total of man-made	767	981	471

Cuprammonium yarns, no longer produced in the UK, are being made on a small, but growing scale in Japan. Fabric cuttings in the Association's publication indicate the excellence of the product and superiority to most rayons. Production of acetate rayon is now increasing. Some is being made from viscose rayon, with the consequent advantage that water can be used as the solvent in process, compared with acetone, in the traditional process. This new method, it is suggested, may lower the price of acetate fabrics.

Japanese nylon, equivalent to Perlon, is sold under the names Grilon and Amilan. Some, as 250 denier, is used for fishing nets. Vinylon is a Japanese monopoly. Made from the cheapest raw materials, it is said to have the advantage over other synthetic fibres of being more moisture-absorbent and so more suitable for wearing apparel. It is also blended with viscose for this purpose. Vinylidene, similar to Saran (UK) has been used for fishing gear, but is now being spum in finer deniers for clothing. Trade names used for this synthetic are Saran and Krehalon.

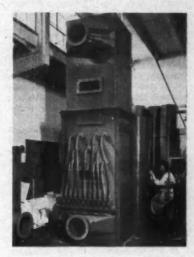
P.v.c. fibre production has been started. This synthetic is sold as Teviron and Envilon. According to the report the cost of this fibre seems to be the lowest of the synthetics. Two acrylic fibres are also being developed—Exlan, equivalent to US Creslan, and Kanekalon, similar to Dynel.

No production is reported yet on the expensive polyester fibre such as UK Terylene or US equivalents Orion and Acrilan, nor are regenerated protein fibres such as Ardil produced.

P.V.C. Installation for Metal Refinery

FABRICATION in rigid p.v.c. of a complete ducting and scrubbing installation for a metal refinery has been carried out by Extrudex Ltd., Bracknell, Berks. The installation includes a number of very large eliminators which remove corrosive droplets from the gases circulating in the ducting system, and several large scrubbing towers in which caustic soda is used for neutralising nitric acid and other vapours.

Main construction material is Vybak VR215 industrial rigid p.v.c. sheet supplied by Bakelite Ltd. It was fabricated by hot gas welding techniques using filler rods of the same formulation. The transparent flexible pipes on the scrubbing towers are extruded from Vybak VN610 p.v.c. compound.



Large scrubbing tower fabricated from Bakelite Vybak VR215 by Extrudex Ltd. The tower forms part of a fume extraction system used in metal refining

Canadian Manganese Recovery Process

Processes for selectively leaching manganese from pyrolusite-type ores and for recovering manganese sulphate monohydrate (MnSO₄: H₂O) from leach liquorshave been reported by B. J. P. Whalley, T. R. Ingrahan et al., of the Canadian Department of Mines and Technical Surveys. According to these workers, enough tonnage can be obtained from finely ground ore residue after it has been processed for iron to satisfy Canada's complete requirements for manganese. This ore shows on assay a content of 3½ to 4½ per cent Mn and is not usable employing existing processes which require a 9 per cent content.

Laboratory investigation has indicated that low-grade pyrolusite-type tailings (under 5 per cent Mn as Mn O₂ with some Mn₃ O₄) can be leached in a slurry of dilute sulphuric acid, pyrite and air at atmospheric pressure and 80° to 90°C, or oxygen or air under pressure and at higher temperatures. Fe++present is stated to act as the active agent in this leaching. With higher temperatures less acid is re-

quired. Acid/ferrous sulphate solution can be produced separately by oxidising pyrite at 130°C and 100 p.s.i. of oxygen.

According to Whalley and his coworkers, thermal precipitation of MnSO₄: H₂O is feasible at 150 °C with a pH maintained at 2. Ninety per cent recovery of manganese from leach liquor, which is saturated at 100 °C, is claimed.

In the proposed plant process the slurry is to be fed through a heat exchanger to a leaching autoclave. Unreacted residues and precipitated iron oxide will then be filtered off. The filtrate containing manganese will be recycled to attach fresh ore, until a suitable concentration of Mn is obtained. This liquor will be heated to precipitate MnSO₄: H₂O: and a portion of the resulting 'barren liquor' recycled with leach liquor to maintain volume in the system.

The air and oxygen processes have not yet been tested on a pilot plant scale, but the laboratory data suggest that full-scale production would be economical.

Preventing Accidents

(Continued from page 254)

a number of factories, the practice is growing of setting up a central safety organisation to co-ordinate the company's policy in relation to accident prevention.

The majority of the accidents in the chemical industry are, like many other industries, not entirely due to the type of process or to the dangerous nature of the chemicals used.

Out of a total of 6,7)7 reported accidents in 1955, more than 4,000 were due to the following causes: The use of hand tools, persons being struck by a falling object, persons stepping on or striking against objects and persons being injured when handling goods or articles.

The majority of the accidents were caused by persons falling or handling objects; in fact a total of 1,241 persons sustained injury by falling and 1,660 persons were injured when handling goods or articles.

Overseas News

Canadian Standard Chemical to Build Sodium Chlorate Unit

IN order to broaden its product services to the Canadian pulp and paper industry, Standard Chemical, Ltd., Montreal, is planning to enter the sodium chlorate field.

According to the vice-president and general manager, the company is in the final stage of an engineering study preparatory to construction of the new manufacturing unit at Beauharnois, Quebec. This study is based on new chlorate cell developments made by Columbia-Southern Chemical Corp., parent company to Standard Chemical.

Chlorine dioxide, widely used by the pulp and paper industry to attain high brightness on paper products, is produced from sodium chlorate. Columbia-Southern Chemical Corp. recently disclosed details of its new chlorine dioxide generating process. This process will be made available to Canadian pulp and paper manufacturers through Standard Chemical.

The multi-million dollar modernisation and expansion programme at Standard Chemical's caustic soda plant at Beauharnois has been completed. This programme, which began in late 1955, has resulted in a 25 per cent increase in chlorine and caustic soda capacity, according to Mr. Powell.

US Statement on China Trade

In a recent statement on trade with communist China the US State Department reports that there has been no further easing of controls but only the working out of an agreement on quotas for communist China made necessary by the recent action of other governments to apply the same controls to communist China that they were already applying to the European Soviet bloc.

This referred to one of the recent meetings of the China Committee to establish quantitative limits for shipments of certain strategic items to communist China for the rest of 1957. The items in question were those on which quotas already existed for shipments to European Soviet bloc.

The United States objective in these discussions was that the quotas be kept as low as possible in order to insure against any significant contribution to the Chinese communists' military potential. An agreement was reached covering most of the items on the quantitative control list. The US will therefore continue to maintain a complete embargo on all trade with communist China. (See also CHEMICAL AGE, 20 July, p. 91.)

Norwegian Company to Exploit Titanium Deposits

A concession has been granted by the Norwegian Government to the Titania A/S of Norway, a subsidiary of the National Lead Co., US, to exploit the extensive titanium ore deposits in the Jossing fjord district in the south-west of Norway. These deposits are estimated to contain some 350 million tons of titanium ore. The Norwegian company are reported as intending to spend Norwegian kroner 75 million on the plant and the equipment required to exploit these deposits. At present Titania A/S produce about 180,000 tons of ilmenite concentrate a year. As the new deposits are developed, output will be raised to 300,000 tons at first and later to 400,000 annually.

Plans for Exploitation of Israeli Phosphate

Experts from British, Italian and German companies will arrive in Israel shortly to undertake a survey of Israel's phosphate resources to determine the possibilities of large-scale exploitation. The Israel Minister of Development, Mr. M. Bentor, announcing this said that it had been estimated that Israel's phosphate resources amounted to between 200–300 million tons valued at from 2,000 to 3,000 million dollars.

Also being studied is the economic practicability of laying a pipeline from the Dead Sea potash works at Sodom to either the Mediterranean or the Red Sea. Transfer of the plant to the coast is provided by the plan. Potash concentrate would then be pumped from the evaporation pans to the outlet port where it would undergo final treatment. Estimated cost of the pipeline is I.£13 million.

Potash production, according to the Minister rose in July to 7,200 tons, two-thirds of the planned target.

DDT being Produced in Egypt

Production of DDT has now begun in Cairo. Annual output will be 700 tons. This first Middle East plant was erected by the Egyptian Health Ministry, at a cost of E£.335,000. Equipment valued at E£.85,000 was supplied by UNICEF (Children's Fund).

Developments in Rumania's Chemical Industry

Plant for dehydrating castor oil required in the manufacture of enamels and paints has now been completed at the 13 Septembric works in Bucharest. At the No. 2 Chemical Combine at Tirnaveni the mounting of a vinyl chloride plant has been completed, and at the Cimpina sulphuric acid factory a new section for hydrosulphate production has been commissioned. Granulated detergents are being produced at the Chimica plant in Timisoara.

Rumania is to construct an acetylsalicylic acid factory for the DPR of Korea under the trade agreement between the Rumanian PR and the DPR of Korea. Designs for the factory are reported to have been drawn up by Iprochim (the Project Institute of the Chemical Industry).

Carbon black exports by Rumania are stated to be increasing. China, Czechoslovakia, Egypt, East Germany, Italy, Poland, Turkey and the USSR are the countries currently importing this material from Rumania.

Most in demand among the various types of carbon black is Carbonret S (MPC) made by the Channel process. Granulation of the Channel type carbon black was achieved in 1956, and this year granulation of furnace carbon black is reported.

Uranium Investment in South Africa

According to Dr. A. J. A. Roux, research and planning director, the Atomic Energy Board, South Africa, has invested £60 million in uranium extraction plants and ancillary sulphuric acid producing plants.

In due course, when there is full production in all the uranium plants, South Africa's annual exports of uranium oxide will be valued at nearly £50 million.

Dr. Roux said that the uranium industry was playing an important part in South Africa's economy. He suggested that it was vital, however, for South Africa to undertake uranium research and development, so that full advantag: could be taken of atomic energy developments by 1964.

Terylene Doing Well in Portugal

Terylene synthetic fibre has recently been introduced into Portugal and is reported to be selling well. A mixture of Terylene with 45 per cent wool is now available and is reported to be meeting the challenge of the German material Rioplex which has been manufactured in Portugal for several years.

Phosphate Production in Tunisia

During the first nine months of 1956, Tunisia exported raw phosphates to the value of 4,367 million francs, and processed phosphates valued at 1,230 million francs. In 1956 the average monthly production of phosphates was 173,100 metric tons (185,000 in 1955). In February this year 144,000 metric tons were mined.

The average monthly production of superphosphates during 1956 was 8,798 metric tons as against 4,592 in 1955. Last year 9,348 metric tons were exported compared with 3,926 metric tons in 1955.

Canadian/US Salt Deal

Salt is to be pumped across the Detroit river from Ojibway, Ontario, by the Canadian Brine Co., a subsidiary of the Canadian Salt Co., to the Solvay Process Division of Allied Chemical and Dye Corporation, US. A 20-year contract has been signed for supplying salt brine.

It is expected that the contract will amount to the export of nearly one million tons of salt a year to Allied Chemical. Dollar value is estimated at approximately \$500,000 a year.

For this project, two 10-inch pipelines will be laid across the river in a 10-foot trench some 30 to 42 feet below the river

surface. Distance across the river will be 2,500 feet. Three 12-inch pipelines will be laid from the Canadian salt brine field and the city land-fill area where the company has mining rights.

Consortium Plans for Pakistan's Proposed Oil Refinery

Cost of the proposed oil refinery in Pakistan is estimated at Rs.180 million (£13.5 million). The consortium, composed of the four foreign companies operating in the country, Shell Petroleum, Standard-Vacuum, Burmah Oil and Caltex, will present the Pakistan Government with its scheme in October. Oil for refining is to be imported.

Indigenous production of petroleum and petroleum products in Pakistan last year totalled 61,000 tons compared with 53,000 tons in 1948. Discovery of the Sui gas replaced 160,500 tons of fuel oil last year and during the current year is likely to replace 233,300 tons of furnace oil.

Union Carbide Silicones Reduce Spalling

Water repellent silicones are being used in the US to prevent damage to concrete bridges and roads by the penetration and freezing of water. Marketed by the Union Carbide Co., these repellents are claimed to reduce spalling (splitting and cracking) and maintenance costs.

Chief causes of spalling are the alternate freezing and thawing of entrapped water and the chemical attack of calcium salts, used for ice removal, on concrete.

Laboratory tests have shown that the amount of water absorbed by concrete during a 24-hour immersion test was reduced by 75 per cent after the application of silicones.

Canadian Dow's Chlorine Caustic Soda Unit

The contract for the new chlorine/caustic soda unit at the Sarnia plant for Dow Chemical of Canada has been awarded to Humphreys and Glasgow, Canada. The cost of the new unit is understood to be over \$600,000.

Chemicals Imported by the Canary Islands

Among imports from the UK to the Canary Islands have been copper sulphate and insecticides. Sulphate of potash and chemical manure have been imported from Belgium. Holland has supplied nitrate, chemical manure and sulphate of ammonia while French imports have included sulphate of ammonia and copper sulphate.

Mexican Glass, Plastics and Chemicals Plants

A large new plant, Panamericana de Vidrio SA, has been inaugurated near Mexico City. It will manufacture automatically, boro-silicate, lead and neutral glass tubing.

According to reports, Pemex have signed a contract for the construction of a Phillips process polythene plant at Azcapotzalco. It is believed also that contracts have been signed for the construction of a carbon disulphide and a dodecyl benzene plant and for three catalytic crackers.

It is said that all these orders have gone to US contractors.

Polish Polystyrene Plant to Use UK Process

A plant to manufacture polystyrene is to be built on behalf of the Polish Government by Petrocarbon Ltd. Location, it is understood, has not yet been decided. Cost of erection of the plant is estimated at US\$960,000. The process to be used will be that of Styrene Products Ltd., which is owned by the Royal Dutch Shell Group.

New French Currency Regulations

Measures announced last weekend by the French Government to protect the francinclude a direct bonus to 60 per cent of French exports amounting to 20 per cent of their value. There is also a tax of 20 per cent on all imports into France except basic raw materials. Importers of these materials, which form 40 per cent of all imports, will still use the official rate of 980 francs to the pound.

The list includes crude oils, petroleum products (gas oils, domestic fuel oils, light and heavy fuel oils), tungsten, molybdenum, cadmium, cobalt, chrome, manganese, titanium, hydroxide and bleached chemical pulp for artificial fibre manufacture. A fuller list will be available shortly. These items will also be allowed into French territories and departments at the official exchange rate.

Shell's Sulphuric Acid Plant at Geelong Refinery

According to a recent announcement by the chairman of the Shell Group in Australia, Mr. J. R. C. Taylor, the sulphuric acid plant at Shell's Geelong Refinery will be completed before the end of 1958 at a cost of some £500,000.

Most of the acid from this plant will be supplied under a long-term contract to the neighbouring works of Cresco Fertilisers Limited, who will use it for making superphosphate. Cresco also expect to have some acid available for sale to industry.

This arrangement represents the latest move towards the fulfilment of the Government-sponsored programme of reducing Australia's dependence on imported sulphur for sulphuric acid manufacture. The potential saving by the operation of the new plant is £250,000 a year.

Dutch Soda Plant to be in Operation Soon

Production of soda is due to start at the end of this year by the Netherlands Soda Industry at Delfzil, in which the Royal Netherlands Salt Industry has a large interest. The plant will have a capacity of 170,000 tons a year, of which 90,000 tons will be required for home consumption. In March or April of the following year, chlorine and caustic soda solution will be produced by electrolysis.

New Sulphuric Acid Plant for Stauffer Chemical

Another sulphuric acid regeneration plant at Hammond, Indiana, to process oil refinery sludge acids is planned by the Stauffer Chemical Co. at an estimated cost of more than \$4 million. Daily capacity will be 400 tons.

Rhodesian Vanadium Corp.

According to a statement by the Rhodesian Vanadium Corporation, issued in Salisbury, the corporation is relinquishing its option on the nickel claims at Bindura, north of Salisbury. A subsidiary of the Vanadium Corporation of the US, the corporation took up development and purchase option on the claims in January this year. Some development had then begun, but it was reported that a great deal of work was required before the Bindura nickel deposits could be mined commercially.

New Gelling Agent For Radiation Resistant Greases

GREASES resistant to radiation, heat and water are produced by means of a new synthetic gelling agent, methyl N-noctadecylterephthalamate, developed by Oronite Chemical Co. US. It is stated that this agent, Oronite GA10 is readily saponified to the sodium salt by dissolving the required amount (4 to 15 per cent depending on the consistency desired) in lubricating oil and heating with sodium hydroxide. The fine crystallites produced are then evenly dispersed by milling the grease in a homogeniser or a colloid mill.

According to the company, sodium GA10 greases are radiation-resistant. Whereas a typical sodium stearate grease is severely damaged by a dose of 100 megaroentgens of gamma rays, the sodium GA10 grease is stated to be still useful after a dose of 500 megaroentgens. This is equivalent to about one year's service in valves for controlling the flow of liquid sodium in a nuclear reactor.

Other properties make GA10 suitable for use in multipurpose greases, it is claimed.

In high temperature performance, sodium GA10 greases are stated to be superior to lithium soap greases. Long-term bearing operation as much as 75°F hotter than lithium base greases (melting points around 350°F) is possible. Sodium GA10 greases with dropping points of 500° to 600°F have been prepared.

Greases prepared with the new gelling agent have been boiled for as long as a week without change. The GA10 greases also have a high tolerance for greases of other types so that changeover to the new type of grease can be accomplished without cleaning of equipment.

The new compound is not limited to gelling lubricating oils, since other liquids such as bis-2-ethylhexylterephthalate, di(p-tolyl)-1-naphthyl phosphate, polypropylene glycol methyl butyl ether, and silicone fluids give a satisfactory gel with sodium GA10. This is considered to open up possibilities of formulating special greases, thixotropic paints, gelled paint removers,

Chemist's Bookshelf

PRACTICAL ORGANIC CHEMISTRY

TECHNIQUE OF ORGANIC CHEMISTRY. Edited by A. Weissberger. Volume III. (2nd Edition) Part II. Laboratory Engineering. Interscience Publishers Inc., New York. 1957. Pp. 391. \$8.

In the new edition of volume III the material has been expanded to such an extent that it has been issued in two parts, the first dealing with general methods of purification and the second, now under review, describing various mechanical operations which are carried out in the laboratory. There are five chapters headed respectively, 'Selection of materials for the construction of equipment', 'Heating and cooling', 'Grinding, screening and classifying', 'Mixing' and 'Operations with gases'.

The general intention of this volume appears to be the introduction of those techniques which have been found successful in chemical engineering and plant operation into the laboratory in order to improve or extend the range of bench techniques. While this is in every way a laudable intention it may be felt that the authors have carried their crusade to somewhat extravagant lengths. The first chapter, for example, which is mainly a lengthy abstract of 'Chemical engineering' and 'Chemical engineering progress', provides such a wealth of data on the corrosion of metals, the mechanical strength of plastics, protective coatings and corrosion resistant cements that the reader rapidly loses sight of the fact that the overwhelming majority of organic chemistry is carried out with the sole aid of Pyrex glass and rubber tubing.

It requires only a brief scan through 'Organic syntheses', however, to restore the perspective.

The most useful chapter is without doubt the last, for here is collected a good deal of information which is not easily available. Some of the devices for gas handling described appear to have the virtue of novelty alone, as for example, in the case of the device named 'Nortons opener-upper' which would not seem to have any advantage over the conventional break-seal.

There is a tendency in most chapters, but particularly in that entitled 'Heating and cooling', to provide a good deal of irrelevant information such as the flame temperature of hydrogen burning in fluorine or the heat of combustion of mixed water and coke oven gases. Again, no less than four pages are devoted to the 'familiar' bunsen burner and its modifications, some of which have a historical interest alone.

The two chapters describing the operations of mixing, grinding, screening and classifying are more satisfactory in this respect and provide a valuable guide to the organic chemist in a field where his operations tend to be haphazard, but some further information upon the methods of particle size analysis would have been relevant to this guide.

To sum up, this volume is an overelaborate survey of some very simple techniques and provides a good deal more information than the average organic chemist working at the bench is likely to use during his lifetime.

J. R. MAJER glyceryl acetates) in treating fluoroacetate poisoning needs to be done. No mention is made of the value of acetamide in poisoning by the moderately toxic fluoroacetamide.

Chemists will find the details of syntheses throughout of great value, and their appreciation of toxic processes considerably enlarged.

Peter Cooper.

Textile Progress in 1955 Reviewed

REVIEW OF TEXTILE PROGRESS. Volume 7. 1955. Published jointly by the Textile Institute and the Society of Dyers and Colourists. Pp. 581. 42s.

This book is an annual review, briefly describing and summarising journal and textbook information published during the year under review and relating to the various branches of textile processing.

The more important and rapidly expanding fields are reviewed each year. However, some sections do not warrant an annual review usually because of the small amount of published work.

This review is divided into 11 sections and these further sub-divided, each sub-section having one or more specialist contributors.

The sections are, 'Physics and chemistry of fibrous materials', 'Fibre production', 'Conversion of fibres into finished yarns', 'Fabric production', 'Colouring matters', 'Colouring of textile fabrics', 'Analysis, testing, grading and defects', 'Laundering and dry-cleaning', 'Building and engineering', 'Industrial application of textiles'.

Of particular interest to the chemist are the sections on physics and chemistry of fibrous materials; this gives a good account of fundamental and technological research work on natural and man-made fibres published during 1954-55.

This annual review is a useful specialist book and in spite of the closely related fields of work discussed in some topics, there is very little overlap.

A name index and subject index are included at the end of the book, but the exact journal references and patent information are given at the foot of each page, which is useful since this method permits easy reference to the paper being quoted.

G. E. STYAN

Toxicity of P and F Compounds

PHOSPHORUS AND FLUORINE: Some aspects of the chemistry and toxic action of organic compounds containing phosphorus and fluorine. By B. C. Saunders. Cambridge University Press. 1957. Pp. 231. 32s 6d.

Wartime research at Cambridge into the production and examination of toxic materials forms the backbone of this monograph. In view of the subsequent value of the phosphorofluoridates and fluoroacetates in the pharmacologist's research laboratory, and as potent weapons against animal pests, the author has happily been entitled to claim that, in his research, the proverbial swords have been turned into ploughshares.

A discussion of nomenclature clears the ground at the start, and a chapter on the mammalian nervous system does not come amiss in a book primarily intended for chemists. The phosphorofluoridates are then treated in detail in their relation to anticholinesterase activity and the structural requirements for high toxicity. There is a note in the chapter on fluoroacetates on the South African Gifblaar, which synthesises potassium fluoroacetate from soil fluoride. Enzymic metabolism of fluorine in plants

leads to the C-F link and its synthesis and rupture; at this point the significance of the Krebs tricarboxylic acid cycle and its blocking by fluorocitrate is put into perspective.

An important chapter on insecticides stresses that there is no simple relationship between toxicity to insects and mammalian cholinesterase-inhibition. A theoretical discussion of enzyme inhibition introduces the medical aspects of organophosphorus compounds. Di-isopropyl phosphorofluoridate has only a limited value against postoperative paralytic ileus and myasthenia gravis, but possibly other esters might be worth synthesising and investigating. Malignant cells appear abnormally sensitive to phosphorofluoridates (as to many other compounds), but it is unlikely that organophosphorus derivatives will offer more than an occasional tool for cancer researchers.

The appendixes treat of fluorine determination, the characteristics of fluorocompounds, and first-aid treatment. Full doses of atropine and artificial respiration are indicated for serious anticholinesterase effects. More work on acetates (particularly

Pocket Encyclopædia

AIDE-MEMOIRE DUNOD CHIMIE. Vol. I: Measures; Physical constants of chemical substances. Vol. II: Properties and characteristics of organic compounds. Vol. III: Inorganic chemistry; Inorganic and organic analysis. By J. Jousset. Dunod, Paris. 1957. Fr. 480 each volume (in French).

In three very small volumes the author has produced a pocket encyclopaedia which contains a wealth of classified chemical information. A detailed index ensures that the information required can be rapidly found.

Volume I includes information on azeotropism, solvents, plasticisers, etc. In volume II more than 3,000 substances are noted and in volume III present-day determinations, in particular the modern methods used, are given for functional groups.

D.L.M.

THE BASIS OF CHROMATOGRAPHY

FUNDAMENTALS OF CHROMATOGRAPHY. By H. G. Cassidy. Interscience Publishers Ltd., London. 1957. Pp. xvii + 447. \$9.75.

This book is Volume X in the series, 'Technique of Organic Chemistry', edited by A. Weissberger. Professor Cassidy was also the author of Volume V in the same series entitled, 'Adsorption and Chromatography', of which about one-third dealt with chromatography. However, no apology need be made for producing a separate volume on this subject in the series. Enormous progress has been made in recent years: in fact, in the foreword, the author reveals that, in 1954, 3,795 references were available on the subject. Much of the earlier discussion has therefore become inadequate. The great wealth of literature has influenced the style of the book and the author has wisely approached the subject at the level of principle and not attempted to write a review or a compendium of methods.

The volume is divided into 15 sections. After a brief introduction to the definition of the subject, the nature of chromatography and the molecular interactions on which chromatographic separations rest are outlined. A survey of the general theory of chromatography follows, which aims at describing the course of separation in terms of concentration, amounts of mobile and stationary phases, and the distribution coefficients. The difficulty in applying one general theory to all chromatographic problems is well illustrated and the section is written in a lucid manner.

A section of the book is also devoted to gas-liquid chromatography and includes the principles, apparatus, procedure, quantitative theory and the practical considerations involved.

Other parts are those dealing with column partition chromatography, paper partition chromatography and some closely related methods, adsorption chromatography, ion exchange, redox resins, foam and emulsion fractionation, methods for recognising and evaluating zones, and the choice of mobile and stationary phases.

A short but interesting section is the one on the relation of R_t to molecular structure, which includes Langmuir's analysis, Lerosen's, Martin's, and Pierotti's approaches.

The final section is entitled, 'On using chromatography' and endeavours to introduce the reader to practical considerations of the subject.

Chromatography is an excellent /path through which to teach chemical principles: in this volume the author has made good use of the possibilities. Within its pages can be found information for which one would otherwise have to search many books.

Important features are the comprehensive subject and cumulative indexes; and 1,042 literature references, some as recent as 1956, are available for further reading.

The book is clearly set out and well printed. It will be a valuable asset to those who wish to understand the basis of chromatography. It can be recommended without reserve but the price may well put it beyond many who would have an interest in it.

R. J. MAGEE

Development of Detergents

SYNTHETIC DETERGENTS: A study of the development and marketing of a new product. By P. A. R. Puplett. Sidgwick and Jackson Ltd., London. 1957. Pp. 241. 42s.

Synthetic detergents have, perhaps, made a greater impression on the general public than any other product of the chemical than the chemical years ago the word 'detergent' was never heard outside a small circle. Now it is familiar to every housewife.

How has this come about? Mr. Puplett's book, which is a survey of detergents up to the end of 1955, gives in a concise and readable form an accurate picture of the process. The treatment is purely from the commercial viewpoint and no more technical information is included than is necessary to distinguish one product from another; not always so easy where different branded products often have the same composition.

After a short history of the soap and detergent industries the author studies the synthetic detergent industry and discusses its importance in comparison with the soap industry.

Nearly one half of the book is devoted to the household market which in 1955 accounted for 475,000 tons of synthetic detergents. The launching of a new product is discussed in detail. This problem is returned to in chapter VII on advertising.

The industrial market is also surveyed, but in much less detail. This is understandable because in the period 1946 to 1955 the industrial market only consumed 20 per cent of total production.

In the concluding chapter the author says: 'For a new product to be launched on the market, three requirements must be satisfied: (1) the product must satisfy a want, (2) the product must be of high quality, (3) the product must be marketed at a price which is competitive with closely related products.

'Even when these requirements are met it does not mean that the consumer will buy the new product.' He has to be made aware of its existence.'

About the controversial question of advertising Mr. Puplett concludes: 'Synthetic detergents on performance alone may, in time, have earned themselves a market, but it has been concluded that, without the advertising and sales promotion support they have enjoyed, that market would certainly not have been realised so rapidly, nor, indeed, may it ever have reached its present importance.' J.P.S.J.

Chemist's Bookshelf

Systematic Account of Dyestuffs and Pigments

KUNSTLICHE ORGANISCHE FARBSTOFFE UND IHRE ANWENDUNGEN. By W. Seidenfaden. Ferdinand Enke Verlag, Stuttgart. 1957. Pp. vii + 256. Paper covers, DM.42; cloth. DM.44.50.

This monograph, which is published in the series 'Sammlung chemischer und chemisch-technischer Beiträge', gives a systematic account of dyestuffs and pigments. The volume is intended for students and it provides a general survey with no claim to the exhaustive coverage which is to be found in the larger classical compilations.

The material has been set out from the standpoint of the chemist rather than of the dyer. Thus we find chapters on di- and tri- arylmethanes, azines, anthraquinones, indigoids, sulphur dyes, azo dyes, phthalocyanines etc. The chemistry and applications of these classes are surveyed from a historical point of view, due attention being paid to recent advances. The structures and methods of preparation of the most important members are given, but the synthesis of intermediates is not dealt with except in a few cases of historical interest.

These chapters are excellent, and the reviewer was particularly impressed by the section on azoic dyes. Dyeing procedures and problems are briefly discussed, partly in an introductory chapter and partly under the individual classes of dyestuffs. It should be mentioned that German trade names are used almost exclusively throughout the whole book.

Misprints are few and the printing of the formulae deserves special commendation, but readers who are susceptible to eye-strain may find that the text is often unpleasantly cramped. The volume has an excellent index, and key references to reviews and to fundamental original papers (but not to patents) enhance its usefulness. The author is to be congratulated on surveying such a wide field in a readable and balanced way.

PETER SCHWARZ

Metallurgical Aspects of Chromium

CHROMIUM. Vol. II. Metallurgy of Chromium and its Alloys. Edited by Marvin J. Udy. Reinhold Publishing Corporation, New York. Chapman and Hall Ltd., London. 1956. Pp. 402. 88s.

The first book of this two-volume treatise on chromium was mainly concerned with this metal from the chemical point of view, whereas the present volume is devoted extensively to the metallurgical aspects of chromium. The editor has divided the book into three main sections, the first of which is given the general title of the recovery of chromium from its ores. It includes chapters by the editor on the section title, on the electrowinning of chromium from the electrolysis of chromic acid, and on the deposition of chromium by methods other than electrolysis. H. H. Jenssen deals with European methods for

Chemist's Bookshelf

the production of ferrochromium, R. R. Lloyd with the electrowinning of chromium from chromium-alum electrolytes and J. M. Hosdowich with the electroplating of chromium.

The second section is devoted to the physical properties of chromium and its alloys and to its use in metallurgy. H. L. Gilbert and R. G. Nelson deal with the possibilities of producing ductile chromium, and there are chapters by various authors on the properties of chromium in austenitic and ferritic steels, cast iron, and high temperature alloys, nickel-base alloys, electrical resistance alloys, and cobalt, aluminium, copper and titanium base alloys. Phase diagrams are included of chromium and various other metals, such as copper, aluminium, etc. The third section consists of only one chapter, which deals with the use of chrome ores as a refractory.

The present volume is probably likely to appeal most to metallurgists engaged in the production and use of stainless steel and the various other alloys of chromium, but the combined series will be found to provide a valuable source of reference on the properties and uses of chromium.

G. S. EGERTON.

Micro-Analysis of Group VIII Elements

TRAITÉ DE MICRO-ANALYSE MINÉRALE: QUALITATIVE ET QUANTITATIVE. Volume III. By Clément Duval. Presses Scientifiques Internationales, Paris. 1956. Pp. 548.

Those who are familiar with the first two volumes of this work will require only to know that the third volume deals with the elements of group VIII together with copper, silver, gold, zinc, cadmium and mercury, and that it maintains the very full treatment given in the previous volumes. They will already know that the work has established itself as a valuable reference source for the analyst

It can be thoroughly recommended to those unfamiliar with it. The first two volumes dealt with hydrogen and the elements of main groups I and II, and of transition groups III to VI of the periodic table. For each element a survey is given of its modes of occurrence, its properties and those of its compounds in each valency state, together with analytical separations from other elements. The account of the qualitative chemical analysis of each element is supplemented by spectrographic, microscopic, fluorescent and polarographic methods where applicable, and includes spot tests, drop tests and crystal tests using reagents both organic and inorganic.

Full descriptions of gravimetric and titrimetric procedures are given, with thermogravimetric curves of many precipitates.

The author maintains a helpful critical approach, and his French is very clear and should present no difficulties. The work, to be completed by a fourth volume, contains a great amount of information, and every analyst should find it of value.

D. W. WILSON

NEW TECHNIQUES IN ANALYSIS

QUANTITATIVE INORGANIC ANALYSIS. By G. Charlot and Denise Bézier. Translated by R. C. Murray. Methuen and Co. Ltd., London. J. Wiley and Sons Inc., New York. 1957. Pp. x + 691. 84s.

Professor Charlot's earlier book on qualitative inorganic analysis is already well known to teachers of analytical chemistry. His new book with Mme Bézier is also unusual and stimulating in its approach and should find a much wider audience than the first book. Dr. Murray's translation of the second French edition, which appeared in 1955, is an excellent one.

The book is divided into two parts, the first of which deals with the theory and methodology of the classical and electrochemical techniques of analysis. The second part deals with analytical methods for 66 principal elements. There is no doubt that as a modern introduction to analytical chemistry as it should be taught in universities, this book would be hard to surpass. The text covers a wide field in a very efficient manner.

For the more advanced student the text may be less satisfactory in certain sections while remaining excellent in others. Thus, in the chapter on polarography, mention is made of the residual current and of the maximum current, while migration and diffusion currents are not defined but merely mentioned in passing, although in the latter instance reference is made to the 'height of the diffusion wave' elsewhere in the chapter. Little stress is laid on the significance of the half-wave potential. The fundamental reason for the existence of maxima is ignored and no explanation is offered for their suppression by gelatin etc. The mechanism of the production of the residual current is similarly passed over.

The keen student will find the explanation of the production of reduction waves elsewhere in the section dealing with the theory of electrolysis, but no cross-reference is given. From the viewpoint of teaching students, it is the reviewer's experience that each subject is best outlined in a chapter which constitutes a monograph on the particular technique concerned. The authors' aim in setting out a chapter on the theory of electrolysis is very laudable in that it facilitates the student's understanding of the interrelationship between various electrochemical methods of analysis. Perhaps a desire to avoid duplication has led to the apparently superficial treatment polarography.

One of the features of many of the newer techniques of inorganic analysis is the application of organic solvents. There are two excellent chapters on the use of water immiscible solvents in organic analysis. Chapter XIII deals with some aspects of liquid-liquid extraction and chapter XII with non-acqueous titrimetry. This latter chapter is in fact concerned with organic applications and unfortunately the authors have not had room to deal with the work of Tomicek on inorganic redox titrations in glacial acetic acid. This latter work is of course

of minor importance in relation to the organic applications cited by the authors. The new techniques of chromatography and ion-exchange are briefly reviewed and also the separation of inorganic substances by distillation.

Part II will be regarded by some as a reference work rather than a laboratory manual. In contrast to the modern approach of the earlier part of the work there appears to be some hesitation in recommending new methods and reagents here, although they are sometimes mentioned by literature reference as possible alternatives. Thus, the tetraphenyl-borane method for potassium is not ever referred to though most authorities would agree that it is superior to all older methods; external indicators are actually recommended for the zinc ferrocyanide titration (the newer—but by no means brand new internal indicators are mentioned only by literature reference).

The book is well written and is a pleasure to read. With the reservations already made, the reviewer has no hesitation in recommending this book as an excellent text for students at university entrance level. Indeed even the few university departments in Britain where analytical chemistry is taught throughout an honours course as a subject to itself could profitably use it. Both teacher and student will find it delightful to use.

T S WEST

Instrument Maintenance for City and Guilds

Instrument Technology: Volume III, telemetering and control. By E. B. Jones. Butterworths Scientific Publications, London. 1957. Pp. xi + 198. 40s.

This third volume on instrument technology completes the series which was designed to cover the requirements of the intermediate and final examinations in instrument maintenance of the City and Guilds College, London.

The present volume deals with pneumatic and electrical telemetering systems, automatic control theory, and automatic controllers.

As in the previous volumes, the text of the third volume is well written and clearly illustrated. The mathematics of control theory has been kept to an essential minimum but is easy to follow.

This book, together with its earlier counterparts, makes a notable contribution to the available literature on instrumentation. Not only can the author feel satisfied that he has achieved his primary aim, but also these books will prove to be valuable for established instrumentation and chemical engineers as works of reference. Furthermore, they will form a valuable basis for undergraduate teaching in chemical engineering courses.

E. J. CHARLES

- The Prime Minister has reappointed SIR LUKE FAWCETT and SIR IVAN STEDE-FORD as part-time members of the UK Atomic Energy Authority until, respectively, 31 December next and 31 July 1959.
- MR. GILES NEWTON, deputy chairman and managing director of Cape Asbestos Company, has been elected chairman in place of Mr. ROBERT WALKER. Mr. Walker, who has been chairman of the company since 1934, is to retire from the Board on

MR. R. H. DENT and MR. T. C. HALE have been appointed joint managing directors.

Mr. T. Muir Warden, Mr. Walker's alternate since 1954, has been appointed to the Board.

- DR. R. Owens has been appointed director of explosives and chemical production in the Ministry of Supply. He was previously an assistant director in the armaments production division.
- MR. J. R. BOWDEN, sales director of The Crookes Laboratories, has left on a business visit to South Africa, Kenya and Mozambique for a month. He is to meet leaders of the South African pharmaceutical industry-it represents a very important £30 million market -and discuss future business possibilities with them. He is also to have off-the-record talks with South Africans who are interested lin both manufacturing and marketing medicines, medical cosmetics and vitamin and veterinary products.

Whilst Mr. Bowden is in Mozambique, he hopes to appoint an agent for that

- The Ardeer Chemical Club arranged a programme for the coming season to include lectures by PROF. W. T. ASTBURY, PROF. A. PORTER and DR. C. H. BAMFORD, director of research, Courtaulds. Sir A. Fleck, chairman of ICI, is president of the Club, and vice-presidents are Dr. James Taylor, Dr. James Craik, Dr. David Traill, and Dr. J. M. Holm.
- MR. S. H. ELLIOTT, managing director of H. J. Elliott Ltd., the Treforest laboratory glassware company, was the winner of the Western Mail Challenge Cup as the best driver in the first Welsh National Road Safety Rally.
- MR. M. HUTTON-WILSON has been appointed chairman of British Chrome and Chemicals (Holdings) Ltd., Urlay Nook, near Darlington, in succession to Mr. E. WRIGHT. MR. A. BURNINGHAM, deputy managing director, has been elected a managing director. Mr. A. HENDERSON, of the firm of Peat, Marwick, Mitchell and Co., chartered accountants, has been appointed a director of the firm.
- ●After 40 years' service with United Alkali and ICI MR. E. TURNER, chief analyst at the Castner-Kellner works, Western Point, Widnes, has retired. Mr.



Turner began his career at the Gateshead works of United Alkali Co. and in 1929 joined ICI research staff at Billingham. He was laboratories manager at the Cassel (Billingham) works from 1931 to 1936 and then came to the Castner-Kellner works as chief chemist.

- DR. OM P. KHARBANDA has been appointed technical assistant to the director and general manager (India) of Simon-Carves Ltd. He will be located at Calcutta,
- ●EDWIN H. BEAUMONT has been appointed director of the industrial adhesives division of Evode Ltd. of Stafford.



Mr. Beaumont, who has held executive appointments in both market research and sales, came into adhesives in 1935, and since then he has travelled extensively selling adhesives technology to manufacturers of every kind in practically every country of the world. He joined Evode in 1951.

- Dunlop's director of projects for the past three years, Mr. CHARLES HEMM, retires this month after 30 years with the company. Before taking up his present post, in which he has travelled extensively, coordinating factory activities at home and abroad, Mr. Hemm was for nine years general works manager at the Cambridge Street factory and a local director there. During the war he was responsible for the production of barrage balloons on a big scale and acted as official adviser on inflatable devices.
- The Ramsay Memorial Fellowships Trustees have made the following awards of new Fellowships in chemistry for 1957-58 to:-

MR. T. E. PEACOCK, a General Fellowship at University College of North Staffordshire; a Glasgow Fellowship to MR. J. K. SUTHERLAND at Imperial College of Science and Technology, London; a Canadian Fellowship to Dr. D. McK. WILES at the University of Leeds; a Japanese Fellowship to Mr. M. MASUI at University College, London; a New Zealand Fellowship to Mr. J. E. FERGUSSON at University College, London; a Spanish Fellowship to Mr. P. ARAMBARRI at Rothamsted Experimental Station, and to Mr. D. Rodriguez at the University of Sheffield; a Swiss Fellowship to DR. R. HUMBELIN at University College, London.

The Trustees have renewed the following Fellowships for the same year to:— Dr. M. J. Stephen (General Fellowship) at the University of Cambridge; Dr. G. S. HARRIS (Glasgow Fellowship) at the University of Cambridge; Mr. C. H. STAM (Netherlands Fellowship) at the University of Leeds; Dr. J. R. VILLANUEVA (Spanish Fellowship) at the University of Cambridge.

Obituary

Mr WILLIAM THOMSON, production manager at the ICI Nobel Division's Ardil factory at Drungans, Dumfries, has died at the age of 54. He had been for 30 years with ICI and was appointed production manager at the Ardil plant in 1952. He trained at Edinburgh University and served with the Tharsis Sulphur and Cooper Co. Ltd. in Spain before going as a research chemist to ICI. He served as manager of the ICI Regent Works, Linlithgow, for some time before becoming manager at the ICI black powder factory at Wigtown. He joined the Ardil plant in 1952. He was chairman of the Dumfries Committee of the Scottish Productivity Council.

The death occurred at Kilmacolm, Renfrewshire, of Mr. GILBERT RITCHIE, chairman of the Parozone Company Ltd., chemical manufacturers, Carntyne, Glasgow. Mr. Ritchie, who was 85, joined the China Inland Mission in 1893, and spent several years in China until compelled to return to this country for health reasons. He joined the Parozone Company, of which he became chairman, in 1931.

MR. C. WHITEHOUSE, formerly a director of Wiggins Teape, died at his home last week.

Mr. EDGAR ALLAN SWIFT, of Menston, Yorkshire, founder and chairman of the chemical and dyestuffs firm of Allied Colloids (Bradford) Ltd., who died on I June, at the age of 75, left £50,590 (net £46,732, duty £13,065). He left all his ordinary shares in Allied Colloids (Bradford) Ltd. and one-half of shares in Allied Colloids (London) Ltd., and Allied Colloids (Manufacturing) Ltd., to his son Keith, and the remaining half of his shares in the two last-named companies upon trust for his daughter Vivien for life.

Chemical Employees in the North

According to a survey by the northern region of the Ministry of Labour, covering Northumberland, Durham, Cumberland, Westmorland and the North Riding of Yorkshire, the number of people in chemicals and allied trades in this area is 55,600.

Commercial News

International Nickel to seek Wider Markets for Its Output

NET EARNINGS of the International Nickel Company of Canada during the first six months of this year were \$16 million lower at US \$45,601,000 compared with the record total of \$51,772,000 in the same period of 1956. Net sales were also lower at \$223.5 million (\$225 million), while costs increased from \$128.5 million to \$135.9 million.

According to the company's chairman, Dr. J. F. Thompson, and president, Mr. H. S. Wingate, greatly reduced world copper prices and the cost of the 11-week strike at the West Virginia Huntington works affected the results. Reduced deliveries of platinum also contributed. Other factors were continuing cost increases. It is reported, however, that these factors were in part offset by larger copper and nickel deliveries, and by higher prices for nickel and mill products.

Capital expenditure during the first six months of 1957 was heavier at \$20,916,000 against \$11,968,000 for the comparative period in 1956. This was due to the company's Manitoba project and the expansion of facilities in the Sudbury district.

The report indicates that at present there are 'unmistakable signs' that the supply and demand position for nickel is tending to equilibrium more rapidly than had been anticipated. In the 10-year period 1946 to 1956, free world nickel production doubled to 450 million lb. annually. Industry did not receive all the nickel it required for civilian use because of the heavy defence and stockpile requirements during and after the Korean conflict. According to Dr. Thompson, the projected free world production capacity in 1961 will be 650 million to 675 million lb., an increase of 130 per cent over 1951.

Developments in the Manitoba area and the increase in capacity in the Sudbury district are estimated to raise International Nickel's future capacity to 385 million lb. annually. By 1961, therefore, there should be over 75 per cent more nickel available for civilian use compared with 1956, assuming that defence demand remains at its present level and that nickel is not taken in 1961 for Government stockpiling.

Dr. Thompson states in this report that a major task again confronts all producers to develop larger markets. The assurance of increased supplies of nickel in the future should stimulate new developments in the uses of the metal and help producers in their programmes for building civilian markets sufficiently large to absorb the increased supplies.

Howard and Sons

Taxed profit for 1956 of the Howard and Sons group was £47,449 (£39,852). A dividend of 4 per cent is being paid. Fixed assets were £687, 525 (£821,446) and current assets £986,385 (967,353). Liabilities

amounted to £304,711 (£300,029). Group turnover increased by 2 per cent. Sales in the UK were up by 13 per cent and those to the rest of the world were down by 22 per cent.

Triplex Safety Glass

Net profits of Triplex Safety Glass for the year to 30 June 1957 have been maintained. The net balance attributable to the group is £308,371 against £307,799 for the previous year, due in the main to reduced tax. Group trading surplus of the company for the year was £911,062, some £43,000 below the 1955-56 record. Dividend on the £1,012,933 ordinary stock is again 20 per cent. Depreciation, etc., charges at £217,691 are heavier this time (£164,980).

Trading surplus of the parent company was £500,237, against £528,929, and net balance, after tax, was £168,821, against

£180,470.

In an interim report of last February the company pointed out that the motor-car industry difficulties would affect profits. The group has, however, expanded into other fields including chemicals.

Canadian Industries Ltd.

An 11 per cent increase in sales for the first six months of this year is reported for Canadian Industries Ltd. by the president, Mr. H. Greville Smith. Consolidated sales for the company and its subsidiaries totalled \$75,200,000. Consolidated earnings for the period amounted to \$5,073,000, an increase of 5 per cent over earnings of \$4,820,000 for last year.

A gain in sales for the company's products is reported and, in particular, sales of polythene and Terylene polyester fibre were higher both in the domestic and foreign markets.

With regard to the company's extensions and new plants, in the second quarter of this year, the York paint plant extension at Toronto came into production. The hydrogen peroxide plant at Hamilton is expected to be completed on schedule before the end of 1957. Start up of the new ammonia plant at Millhaven has, however, been delayed owing to difficulties in the installation of a major piece of equipment.

Mention is made in this interim report of the two sulphuric acid plants which are now under construction at Copper Cliff, Ontario, and Beloeil, Quebec. Also under way is the engineering and design work to double the capacity of the Edmonton polythene plant.

British Nylon Spinners

Nominal capital of British Nylon Spinners Australian Proprietary, has increased from A.£1 million to A.£2 million to permit financing the Australian company's new factory near Melbourne. The funds will come from the parent company in England.

It is reported that construction of the factory is almost complete and production is expected to start in January, eight months ahead of schedule.

NEW COMPANY

H. WALTER AND COMPANY LTD. Cap. £1,000. Importers and exporters of and dealers in chemicals, minerals, raw materials and general merchandise. Directors: Heinrich Walter, director of Westo Ltd., Alfred Fischer. Reg. office: 5 Addison Avenue, W11.

SATISFACTION

MANCHESTER OIL REFINERY (HOLDINGS)
LTD. Satisfaction 9 July, that all the
property charged by a deed of indemnity
and debenture registered 16 July 1950 was
released from the charge although the
indemnity in respect of which the charge
was made remains in full force and effect.

Market Reports

COPPER SULPHATE PRICE REDUCTION

LONDON Firm conditions obtain in most sections of the industrial chemicals market although the volume of enquiry has not yet returned to the pre-holiday scale. The weeks ahead should see a full resumption of contract deliveries to home consumers. The only price change of note is a reduction to £80 5s per ton in the price of copper sulphate and an alteration received too late for last week's report is an increase in the price of sodium sulphite anhydrous to £71 10s as from 1 August. Cresylic acid and creasote oil continue in fair request on an otherwise quiet coal-tar products market.

MANCHESTER The firm undertone has continued in virtually all sections of the Manchester chemical market during the past week. Outstanding among actual changes since the last report has been a rise

of £3 a ton in sulphide of soda and one of £4 in percarbonate. There has been little alteration in trading conditions compared with recent weeks, contract movements and actual new business being reasonably satisfactory considering holiday stoppages. Some sections of the fertiliser trade are fairly active, and a steady demand for most of the light and heavy tar products is reported.

GLASGOW A reasonably good week's trading can be reported from the Scottish market with business showing an improvement on last week. Some forward bookings have been placed, and demands for contract requirements have been fairly well taken up. On the whole prices generally have been firm. There is still considerable interest being shown in chemicals for overseas market.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London W.C2, price 3s. 3d. including postage; annual subscription

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection on 28 September

Adhesion of textile fabric to butyl rubber. United States Rubber Co. 783 659 Polyepoxide emulsions. Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij. 783 740 Fatty alcohols. Hedley & Co. Ltd. T.

Polymerising unsaturated aldehydes. Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij. 783 741 Preparation of formamides. Rohm &

Haas Co. Impregnated shaped bottles of graphite or carbon. Farbwerke Hoechst AG. Vorm. Meister, Lucius, & Büning.

Rubber vulcanisation accelerators of im-proved dispersibility. Monsanto Chemical Co Liquid detergent compositions. Armour 783 585 Co.

Nitrosamines. Hercules Powder Co 783 663 Treatment of polythene. Celanese Corporation of America. 783 664 783 664

Contacting liquids with solids. Transvaal & Orange Free State Chamber of Mines, and Porter, R. R. 783 483 Aqueous colloidal dispersions of poly-783 483 fluoroethylenes. Du Pont De Nemours

& Co., E. I. 783 742
Apparatus for use in pulverising or similarly processing agglomerated or integrated materials and blending or mixing such materials. Andrews 783 588 Beaven Ltd.

Antibiotic filipin. Illinois Foundation, University of. 783 486 Polymerisation of ethylene. Du Pont De Nemours & Co., E. I. 783 487
Derivatives of 3.5-dioxopyrazolidines.

Farbenfabriken Bayer AG. Production of a normally solid polymeric hydrocarbon material, Standard Oil Co. 783 744

15, 151-dehydro-beta carotene. Hoffmann La Roche & Co. AG., F. 783 389 Cellular cured polymeric material. American Cyanamid Co. 783 745
Polyvinyl acetals. Celanese Corporation 783 390 of America.

Single crystals of ferrite. Western Electric 783 670 Co. Inc. Electrostatic precipitators. Air-Maze Corporation. Terpolymers and compositions. Monsanto Chemical Co.

783 672

Cumene hydroperoxide. Montecatini Soc. Generale per l'Industria Mineraria e Chimica. Boron nitride metal carbide bodies. Car-

783 747 borundum Co. Phosphate coatings on metals. American Chemical Paint Co. 783 749 Process for applying stable water-repell-ent coatings to fibrous materials. Ciba

Ltd. 783 752 Monoazo dyestuffs of the benzene-azoquinoline series and metal complexes arbenfabriken Bayer AG. 783 753 Copolymers. Farbenfabriken Bayer AG

783 677 Amorphous silica. General Electric Co. 783 754

Resinous condensation products of basic aluminium salts of organic acids. Koninklijke Industrieele Maatschappij Voorheen Noury & Van Der Land 783 679

Liquified gas storage vessels. Zijistra, E. J. S. 783 399 Heat-exchanger. Combustion Engineering 783 681 Pyridine-4-aldehyde acetals. Opfermann, 783 402 A. C. J. Apparatus for atomising metal.

Chemical Co.
Thiourea derivatives. Geigy AG. J. R.
783 690 783 685 Centrifugal separators. Hercules Powder 783 405

Production of alcohols. Farbenfabriken Bayer AG. 783 761
Recovery of phenolics from industria
wastes. Allied Chemical & Dye Cor 783 761 industrial

783 762 Substituted haloacetyl piperazines. American Cyanamid Co. 783 763 can Cyanamid Co. Hardening of epoxide resins. Chemische

Werke Albert Neoprene cement. Firestone Tire & Rub-ber Co. [Divided out of 776 827.] 783 768 783 769

Open to public inspection on 18 September

of hydrocarbon lubricating Treatment oils. National Research Council

783 165 Separators for fluids. Rambaut, K. R. V 783 173

Regeneration of monomers starting from a polymethacrylate, especially from methyl polymethacrylate. Segui, E. D. 783 073 and Alarcon, B. C. Basically substituted carboxylic acid

amides. Farbwerke Hoechst AG 782 971 Organic plastic materials in expanded or

cellular form. Genatosan, Ltd. 783 269 cellular form. Genaussan, Ester oils derived from terpenes. Ruhr-782 973 chemie AG. 782 973
Quaternary ammonium compounds and

applications. Ciba Ltd. Cadmium salts of alpha-hydroxy fatty acids, their preparation and resins stabilised with said salts. Carlisle Chemical Works, Inc. 782 894 Fungicides. Farbenfabriken Bayer AG

782 978 Carbonisation processes. Minister of Fuel & Power. 783 179 Organic compounds containing phos-783 273

phorus. Ciba Ltd. Steroid compounds. G.N.R.D. Holdings, Ltd. 783 092 polychlorobenzenes. Manufacture of Schering AG. Detergent compositions. Unilever, Ltd. 782 898 Process and apparatus for separation of gaseous components from gaseous mixtures. Stone & Webster Engineering 782 901 Corp

Hexafluorides of uranium and plutonium. UK Atomic Energy Authority. 782 982 Phosphate of reduced fluorine content. Ltd Fisons. [Cognate application 783 280 26115.] Manufacture of cellulose esters. British

Celanese, Ltd. 782 903
Pesticidal basic esters of phosphorothiolothionic acid. Imperial Chemical Industries, Ltd.

Catalytic hydrogenation of carbon monoxide. Rheinpreussen AG. Für Bergbau Und Chemie. 782 906

Chemie.

Benzene carboxylic acids. Newby, H.

(Chemische Werke Hüls AG.) 783 286

Ethyl esters of substituted thiobenzoic acids. Imperial Chemical Industries Ltd. 782 909

Organic boron- and sulphur-containing dditives for fuel and lubricating oils. Esso Research & Engineering Co.

782 989 Process for the treatment of fibres, fibres and fibrous material with corrosive gases and/or vapours. Dungler, J

783 287 Phenthiazine derivatives and processes for their preparation. Soc. Des Usines Chimiques Rhonepoulenc. 783 289

Substituted alanines. National Research Development Corp. [Addition 750 155.] 783 292

Means for delivering small quantities of liquids. Kunstzijdespinnerij Nyma N.V.

Detergent powders. Unilever, Ltd. 783 193

Production of acid-free esters. Newby, (Chemische Werke Hüls AG.) 782 925 Rubber compositions. Imperial Chemical Industries, Ltd. 782 996

Preservation of fruit and other products. Monsanto Chemicals, Ltd. 783 194 Ceramic substances derived from chro-mium sesquioxide. UK Atomic Energy Authority. 782 997

Thorium compounds. UK Atomic Energy Authority. Purification of polymyxin, Distillers Co. 782 926

Production of bacitracin. Glaxo Laboratories, Ltd. 782 999 1.2-alkylene-diamino-N.N1-diacetic acids and their salts. Geigy AG., J. R.

782 928 Preparation of potassium polyphosphate. Imperial Chemical Industries, Ltd.

Plasticising of halogen-containing organic materials. Dehydag Deutsche Hydrierwerke Ges. 783 300

Compositions for preventing corrosion. Fontana, A. 783 115 Curable organopolysiloxanes. General Electric Co.

Stabilisation of soap. Unilever, Ltd. 782 932

Heterocyclic acid diammonio Laboratories. [Addition Cutter 770 581.] 782 935

Diammonio esters containing two hetero-cyclic groups. Cutter Laboratories. cyclic groups. Cutter [Addition to 770 581.]

Apparatus for reducing the noise of a fluid stream. Power Jets (Research & Development) Ltd. 783 003

Trihalo-1-D-ribofuranosyl-benzimidazoles compounds. Merck & Co., Inc. 783 306 Production of metal chlorides. Columbia-Southern Chemical Corp. 783 006

Plasticisers and gelatinising agents. Dehydag Deutsche Hydrierwerke Ges.

Separation of polycarboxylic acids from mixtures containing them. Henkel & Oil soluble resins. Petrochemicals, Ltd. 783 007

Reduction of hydrogen sulphide and mer-captan sulphur content of aqueous caustic alkali liquors. Gelsenberg Benzin AG. 782 942 Organopoly-siloxanes. General Electric 783 313

Purification of relaxin. Warner-Lambert Pharmaceutical Co. 783 314 Kallikrein-inactivator. Farbenfabriken Bayer AG. 783 316 Removal of heat exchange medium from

heat-exchange systems. Foster Wheeler, 782 943 Method of reducing the water content of

raw cement slurries. Benckiser Chemische Fabrik, J. A. 70 783 129 Detergent composition of improved foam

performance. California Research Corporation. 783 318 Steroid derivatives. Merck & Co. Inc

Oxidation colouring matters. Compagnie Française Des Matieres Colorantes. 783 321

Production of porous polyethylene bodies. Ruhrchemie AG. Unsaturated esters of epoxy-substituted

polycarboxylic acids and polymers thereof. Naamlooze Vennootschap De thereof. Naamlooze Vellanden Bataafsche Petroleum Maatschappij. 783 132

Plasticising cellulose-derivatives. Gevaert Photo Producten NV. 783 016 Utilising carbon content of washery slack and other mineral substances having a content of carbon, such as oil shale. Eschweiler Bergwerke-Verein. 783 215

Non-catalytic process for preparing tere-phthalic acid methyl esters. Naamlooze Vennootschap De Bataafsche Petro-leum Maatschappij. 783 017 Preparation of bis amides. Rohm & Haus

783 330 Preparing a dialkyl monochloromethane-phosphonate and the resulting product. Victor Chemical Works. 783 018

Calcium chloride. Columbia-Southern Chemical Corp. 783 019 Leather substitutes. Du Pont De Nemours E. I.

Leather-like sheet material. Du Pont De Nemours & Co., E. I. August 12, 1955. 783 020

processes of preparing them and photographic emulsions containing them. Kodak, Ltd. 783 021

Manufacture of therapeutically active amines and salts thereof. Hoffmann-La

Roche & Co. AG., F.

Production of moulded bodies of detergent sulphonates. Deutsche Gold- Und Silber-Scheideanstalt Vorm. Roessler. 783 223

Preparation of phthalic anhydride. Chem patents Inc. 783 025
Detergent compositions in tablet form.
Unilever, Ltd. 783 027 783 025

Process and apparatus for the production, without catalyst, of synthesis gas from concentrated gaseous aliphatic hydrocarbons and oxygen. Montecatini Soc. Generale Per l'Industria Mineraria e Chimica. 783 141

Method for reducing corrosion in lubri-cating systems. Esso Research & Engineering Co. 783 033 Foamed polystyrene. Koppers Co., Inc. 783 034

Production of organic sulphur compounds and resulting products. Geigy AG., 783 037 Production of substituted para-benzo-quinones. Farbenfabriken Bayer AG.

Catalyst for polymerisation of air-drying unsaturated polyester resins. Chemische Werke Hüls AG. Halogenated organosilicon compounds.

Midland Silicones, Ltd. 782 968 6-halogen-3-hydroxy-benzoates and process for their manufacture. Farbwerke Hoechst AG. 783 047

Steroid compounds and the preparation thereof. Pfizer & Co., Inc., C. 783 048 Reinforced polytetrafluoroethylene pipe and method of making it. Resistoflex Corp. 783 246 Steroid compounds, Pfizer & Co., Inc., C 783 240

N-monosubstituted stituted monoureines of Badische Anilin- & Sodaof glyoxal. Fabril abrik AG. 783 051

and their Phthalocyanine hthalocyanine derivatives and their manufacture. Du Pont De Nemours & Co., E. I. [Addition to 745 359.] derivatives

Polymerisation catalyst. Polymer Corp., 14d. 782 970 Naamlooze

Lubricating compositions. Naamlooze Vennootschap De Bataafsche Petrol-leum Maatschappij. 783 158 783 158 Installation for utilising the sensible heat

of gases to generate steam. Koppers Manufacture of silica glasses. Quartz Silice. 783 244

Production of hydrocarbons. Koppers 783 061 Ges., H. Detector apparatus for use in connection with the filling of containers with pliant

or granular material. Du Pont De Nemours & Co., E. I. 783 065 Method and apparatus for marking seal closures on glass bottles. American Cyanamid Co. 783 250 1-Aminobenzophenone-sulphone-2-carboxylic acids or their esters.

Anilin- & Soda-Fabrik AG. Apparatus for effecting the depolymerisation of polymeric esters. Segui, E. D. and Alarcon, B. C. [Divided out of 783 073.] Treatment

reatment of hydrocarbon lubricating oils. National Research Council. [Divi-ded out of 783 165.] 783 166 Treatment of hydrocarbon lubricating oils with metal salts. National Research Council. [Divided out of 783 165.]

783 167 3-Pyrazolidone compounds. Ilford, Ltd. 650 911

Oximes. Inventa AG. Fur Forschung Und Patentverwertung. 677 386

Agency Sought

Len Cooper Ltd., PO Box 3796, Nairobi, wish to represent UK manufacturers of a full range of laboratory equipment for brewing, hospital and veterinary use.

TRADE NOTES

Suprol CM

Low irritant properties are claimed for Suprol CM, a cosmetic detergent made by Sipon Products Ltd., 23 Dryden Chambers, 119 Oxford Street, London W1. The composition of the new material has not yet been disclosed but it is stated to be quite different from the traditional lauryl alcohol

Uses are mainly in the cosmetic field although some industrial applications are also possible where absence of irritation is

required.

783 050

BDH Offer

A notice from British Drug Houses Ltd. says that some laboratories still have in store supplies of concentrated volumetric solutions issued in the original wax ampoules several years ago.

After so long it has been found that these ampoules tend to split or crack under pressure and it may be dangerous to open them in the usual way. BDH ask their customers to destroy any wax ampoules still in their possession, promising to replace them without charge by the polythene ampoules now in use.

Polythene ampoules were substituted for wax ampoules at the end of 1953. So far, claim BDH, there has been no indication that their condition changes in any way on prolonged storage.

Fibre-glass Reservoir Tanks

As a result of a technique recently developed by Microcell Ltd., Imperial Buildings, 56 Kingsway, London WC2, it is now possible to make large reservoir tanks of 48,000 gallons capacity for water or other liquids of standard fibre-glass panel units. The specially designed units are bolted together to form a liquid-proof base and walls. The tanks can be open at the top or completely enclosed.

As the panel units are only about a quarter the weight of comparable size steel panels, it is claimed that they can be more easily transported and assembled. Another advantage of using fibre-glass is that this material is completely corrosion-resistant. The tanks therefore require no painting with protective paints.

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Styrene Appoint New Agents

From 1 July Styrene Co-Polymers Ltd. have appointed Polymers (NZ) Pty. Ltd., Saleyards Road, Otahuhu, as their New Zealand agent to replace Buckley and Young Ltd., 8 Cook Street, Auckland.



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(College of Advanced Technology) Manresa Road, S.W.3 DEPARTMENT OF CHEMISTRY
Session 1957-58
A course of 20 postgraduate lectures on "Biochemistry" (to

A course of 20 postgraduate lectures on "Biochemistry" (to be arranged in four groups) will be given by Dr. E. M. Crook, M.Sc., A.R.I.C. and Professor F. L. Warren, M.A., D.Sc., on Mondays 7.15 to 8.30 p.m., during the period 7 October, 1957, to 17 March, 1958. The course is designed for students who possess a knowledge of chemistry to degree standard. Fee: £2 for whole course or 10s. for each group.

A leaflet giving details is obtainable from the Secretary.

EDUCATIONAL: continued

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Inquiries from industrial firms, research organisations and Government departments will be welcomed. Particulars from the Secretary, Chelsea Polytechnic, Manresa Road, S.W.3.

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